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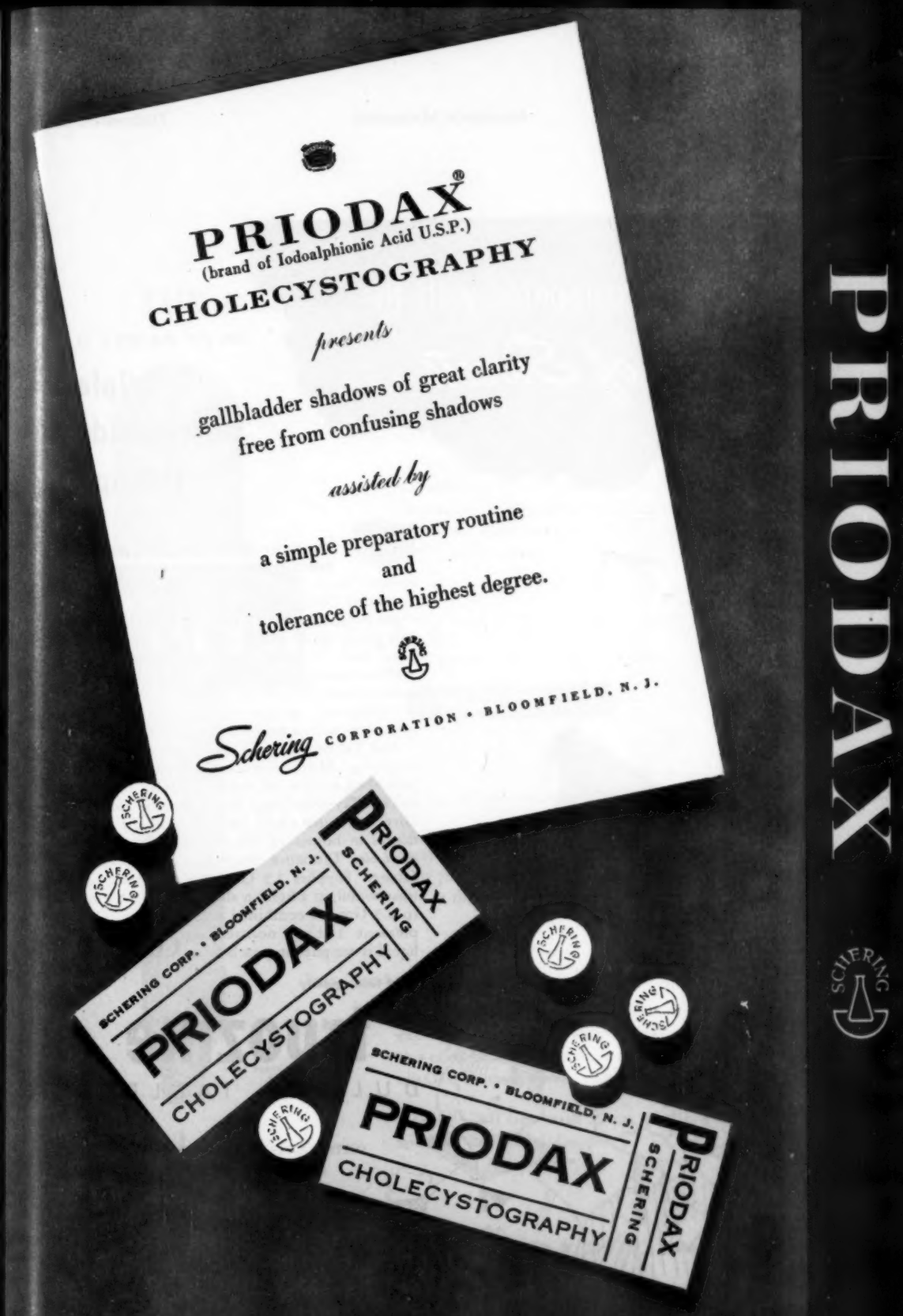
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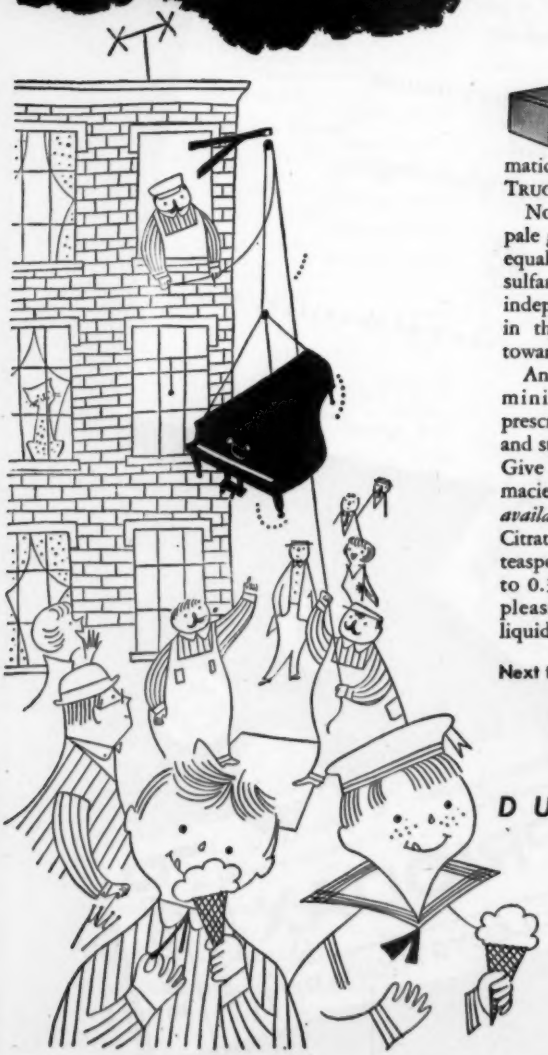

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**Gosselin, George A., M.D. Neurology and Physiology in Functional States Connecticut State Medical Journal 15: 109-113, (February) 1951*

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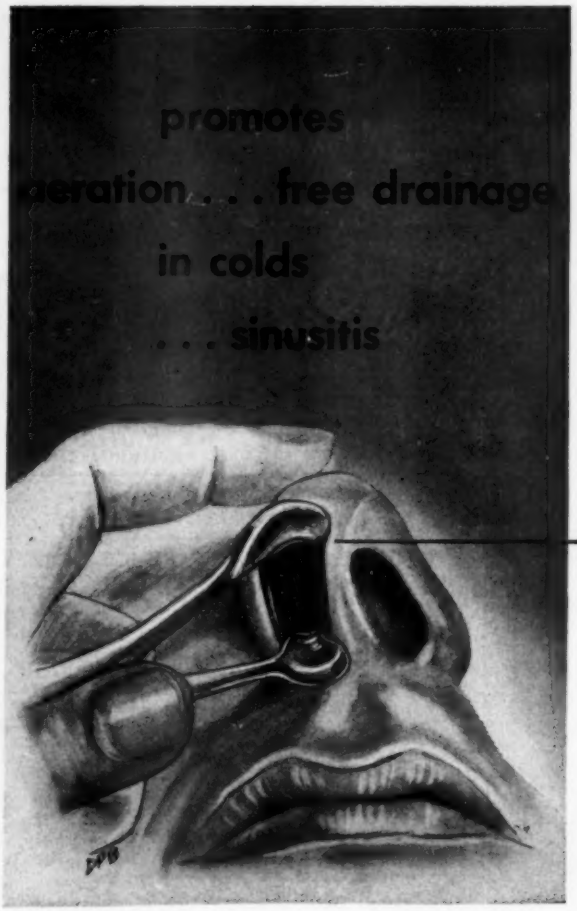

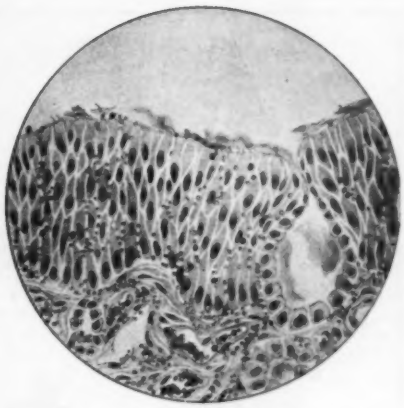

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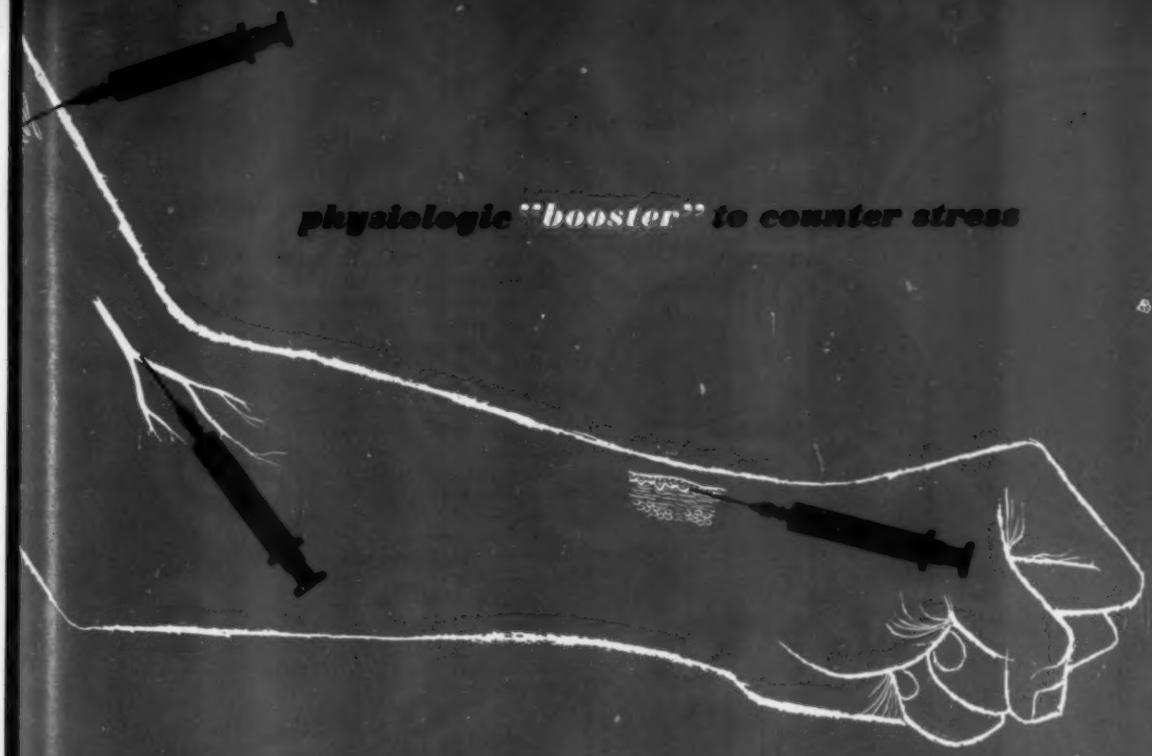

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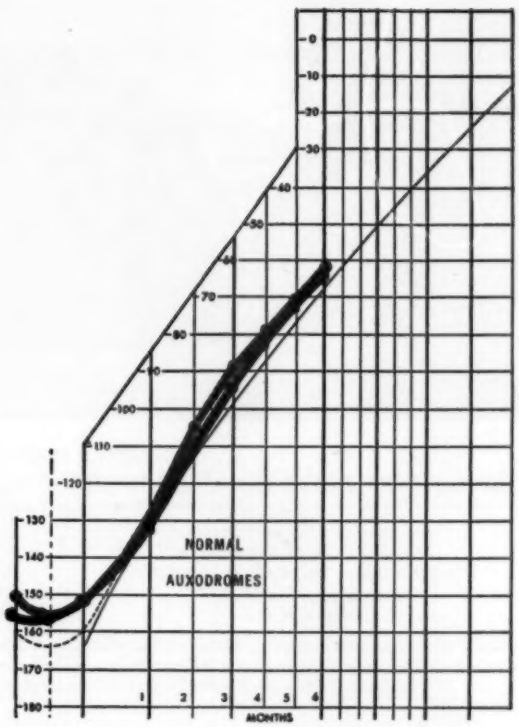
1. Wetzel, N. C.: J. Pediat. 29:439, 1946.
2. Jackson, R. L., and Kelly, H. G.: J. Pediat. 27:215, 1945.



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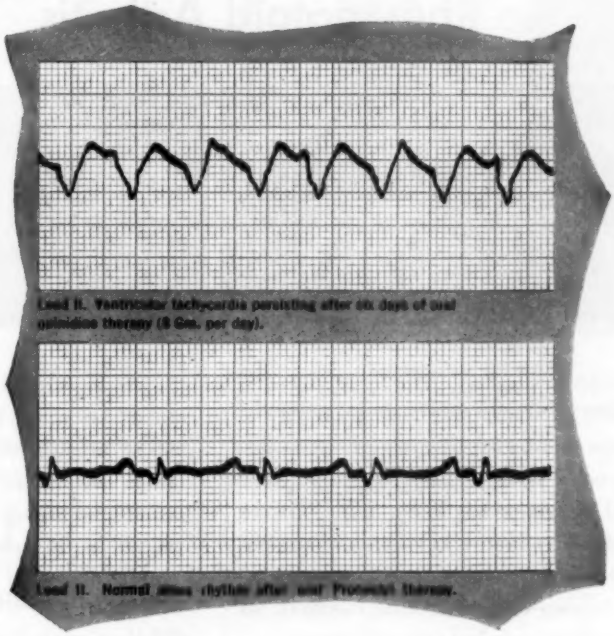

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INDICATIONS FOR SURGICAL THERAPY IN EPILEPSY*

JOHN R. GREEN, M. D.
Phoenix, Arizona

Among the classic descriptions of diseases is the definition of epilepsy in 1866 by Hughlings Jackson(1):

> "The term should be degraded to stand for our knowledge, or rather for our ignorance, of the various permanent and temporary conditions of nerve tissue in functional divisions, or perhaps in nutritive regions, which conditions cause or prevent temporary failures or losses of function."

Despite some progress the inherent difficulties of the subject still create problems as to semantics, physiology and therapy.

For practical purposes, there are two major types of epilepsy: (1) Symptomatic, or acquired, and (2) Idiopathic, or cryptogenic. *Symptomatic epilepsy* includes focal and non-focal epilepsy of various types, which are secondary to known etiologic agents or lesions. Many of these patients with focal seizures should not be regarded as "epileptic," according to Walter(2). *Idiopathic epilepsy* includues non-focal seizures in which a cause cannot be surmised or found.

Therapy in epilepsy is primarily medical, with two exceptions,—namely: (1) Symptomatic seizures which are due to expanding intra-cranial lesions (i.e., neoplasms, abscesses, hematomata, etc.,) and (2) Chronic focal seizures of cortical origin which cannot be controlled satisfactorily with medications. The evaluation of these exceptional cases is discussed below.

DIAGNOSIS OF FOCAL EPILEPSY

The diagnosis of focal epilepsy is established by answering two specific questions about each seizure problem: "(1) Where is the focus?, and (2) What is the cause?" (Penfield and Erickson(3).) The methods used to answer such diagnostic queries are a combination of (A) Clinical history and examinations, and (B) Laboratory examinations.

(A) *Clinical history and examinations*:

An accurate description of the aura and seizure pattern will provide the necessary information about the location of the focus of the initial "firing" of neurones, in many instances. This is particularly true of focal motor (Jacksonian) and various types of focal sensory auras and seizures. Epilepsy with "psychomotor" manifestations may indicate localization within the anterior temporal region or involvement of its subcortical connections. Generalized convulsions, without focal components, may represent initial "firing" from a "silent" functioning area of the cerebral cortex, but do indicate involvement of subcortical structures, directly or indirectly. Opisthotonic (decerebrate, cerebellar, tonic-postural) seizures usually mean that the pathology is affecting the brain stem. Minor seizures, of the triad described by Lennox(4), i.e., (1) brief lapses of consciousness (Petit Mal), (2) myoclonic jerks of the arms ,and (3) sudden drop seizures, are believed to have a subcortical origin.

It is apparent that unless further evaluation discloses an expanding lesion, surgical intervention is considered only if *cortical* localization is definite, intensive medical therapy has been ineffective, and if here is some hope of rehabilitating the patient socially and economically.

*Presented at The Third Western Institute on Epilepsy, June 22-24, 1951, Salt Lake City, Utah.
From the Neuro-Surgical Unit of the Arizona State Hospital, and the Neuro-Surgical Service of Good Samaritan Hospital, Phoenix, Arizona.

Evaluation of the patient with the symptom, "epilepsy," is incomplete unless the cause of the disorder is investigated. The nature of the pathology which may be producing the seizures is frequently suggested by the age of the patient at the time of the first attack. For example, idiopathic (cryptogenic) epilepsy usually begins in the second decade of life. During the first two years of life epilepsy most commonly is caused by traumatic, degenerative, and congenital abnormalities. Febrile illnesses may create transient seizures and less commonly habitual attacks. When seizures start for the first time during childhood, birth injury, trauma during infancy, and occasionally febrile illness are the usual causes. Trauma and infantile brain injury may be the cause of seizures during the adolescent period, although lacking such history, the classification of idiopathic epilepsy is frequently necessary. From about 18 to 35, cerebral trauma most frequently precipitates attacks, and neoplasms occasionally. During the next twenty year period (35-55), the leading causes of seizures are: first, neoplasms; and then cerebral injury, and arteriosclerotic encephalopathy. From 55 to 70 years of age, the causes are the same with arteriosclerotic etiology becoming more frequent.

(B) *Laboratory examination*:

(a) *Electro-encephalography.* Important correlation of electro-encephalography and epilepsy began with the report of Gibbs, Davis, and Lennox(5), in 1935, that during a minor seizure (Petit Mal) the normal rhythm was replaced by 3/second wave and spike abnormality. Epilepsy has probably been studied more by EEG workers than any other condition since that time. Pioneer contributions in localization of brain tumors with this technique were made by Walter(6) as early as 1936. Although the EEG, like other laboratory methods, is not infallible, and is not specific for various types of pathology, it does indicate with a high degree of accuruacy if abnormality is present and whether or not it is localized.

Clinical seizure patterns, which suggest stationary focal cortical disturbance, may show EEG features of localized abnormality. The commonest forms of such electrographic disturbances have been tentatively classified as follows (Walter (2)):

1. *Spikes.*
2. *Saw-tooth or square waves.*
3. *A combination of spikes and slow waves.*
4. *Slow waves.*

Localized spiking is commonly associated with clinical signs of cortical discharges and is generally regarded as indicating an "irritative" condition of the cerebral cortex,—the most reliable EEG evidence of focal epilepsy. Various methods of "activation" of the electro-encephalogram have been found useful to demonstrate these and other abnormalities,—such as, hyperventilation (Gibbs, Gibbs, and Lennox(7)), metrazol (Kaufman, Marshall and Walker(8)), Ziskind and Bercel(9), metrazol-photic stimulation (Gastaut(10)) and sleep (Gibbs and Gibbs(11)).

(b) *Roentgenologic studies.* Plain films of the skull occasionally may indicate the location of the focus of the seizure disorder and its pathologic nature. Cerebral pneumography and angiography are frequently very informative in this regard and may be advisable if the location and cause of the epileptiform abnormality has not been ascertained by other methods.

THERAPY OF FOCAL EPILEPSY

Seizures, which are secondary to expanding lesions of the brain, require immediate neurosurgical treatment. Focal epilepsy due to other causes should be managed satisfactorily with anti-convulsant medications, in the majority of cases.

I. *Medical.*

Medications are prescribed alone or in combination to the point of toxicity, including periods of prolonged sleep as described by Putnam(12). In general, seizures that follow cortical lesions respond to Phenobarbital, Dilantin, Mebaral, and Bromides, in approximately that order, and can be eliminated in more than 50% of the cases and decreased in another 25% of the patients (Walker(13)). Experimental drugs, not yet released, may improve these percentages. Surgical intervention has little point if the patient is so crippled physically or mentally as to have no chance for rehabilitation even if the seizures are stopped by surgery. It follows that no more than 20-25% of patients with chronic focal elipepsy become candidates for neuro-surgery.

II. *Surgical.*

The surgical treatment of focal epilepsy probably began in prehistoric times (Neolithic period of man in Europe and the era of the Peruvian Incas) with craniotomies to release evil spirits, including those thought to be causing epilepsy.

Directions for making a trephination on the side of the head opposite to a focal seizure were recorded by Hippocrates. Sir Victor Horsley's first craniotomy, on May 25, 1886, was for a cortical excision in a case of post-traumatic focal epilepsy,—a successful procedure.(14)

The remarkable work of Dr. Wilder Penfield and associates, since 1928 has indicated that 50% of the patients they have operated upon for focal epilepsy have been relieved, or almost relieved of attacks, and that another 25% of these patients were improved by the procedures (Penfield and Steelman(15)). Electrocorticographic controls were added to the surgical armamentarium by these workers, in 1938, under the direction of Dr. Herbert Jasper. Refinements in these techniques have led to the observation that the role of the meningocortical scar is of less importance in the production of seizures than the pathologic cortex just adjacent to the cicatrix (Walker(16), Penfield(17)). Valuable data about the nature of the epileptic discharge has been obtained with electrocorticography. The tendency to direct the surgical extirpation by the use of the method alone has definite limitations (Meyers et al(18)), and, to date has not given appreciably better results than the simple removal of scars in instances of pathologic lesions (Bailey(19)). It is possible that as the applications of electrocorticography are better understood, the clinical results will improve.

The work of Fuster, Gibbs and Gibbs(20) suggesting that "psychomotor" seizures are focal in the anterior portion of the temporal lobe on one or both sides has created controversy as to terminology and concept, but has also stimulated intense investigative efforts, both in the clinic and laboratory. Experiences with anterior temporal lobectomy in cases of psychomotor epilepsy have been reported to show clinical results that are, to date, comparable with those obtained in the surgical treatment of other types of focal epilepsy (Bailey and Gibbs (23), 24), and Green, Duisberg and McGrath 21, 22).

Our observations(24) have led us to believe that the psychomotor seizure mechanism may involve a bilateral anterior temporal-subcortical circuit. These connections have been suggested in lower animals (Ajmone-Marsan, Stoll, and Jasper(25), and Hunter (26)), but have not been established in man. In psychomotor epilepsy, it would appear that an area of neuronal pathology may fire this circuit in either direction, with local or generalized clinical and electrographic phenomena(24). It follows that clinical symptoms, signs, pathology and EEG abnormalities should be localized to the anterior temporal region, without evidence of major involvement of sub-cortical connections if surgical therapy of psychomotor epilepsy is to have maximal chances of success. More specifically, it has been observed that clinical states of rage, terror, fixed delusions, and psychotic abnormalities, in association with temporal automatisms and focal spiking on the EEG in the anterior temporal region, seem to indicate major involvement of subcortical structures, and have not been improved by anterior temporal lobectomy. Similarly, patients who manifest psychomotor states, focal pathology in the anterior temporal region, and at the same time show evidence of EEG dysrhythmia of subcortical origin are not considered to be satisfactory candidates for surgical intervention(24).

CASE REPORTS

Three cases are briefly described in order to illustrate some of the principles involved in the evaluation of epileptic patients for surgical intervention.

Case 1.

F. E., a 47 year old farmer developed a *generalized convulsion* on March 12, 1950. He had suffered no remarkable illness or injury prior to this date. There were no definite neurologic findings. Skull X-Rays were normal except for a slight increase in vascularity in the left frontotemporal region. Electro-enecphalography on March 17, 1950 was normal. Spinal fluid studies revealed an initial pressurue of 250 mm. of water, and normal fluid findings except for a total protein of 63 mg.%. He was referred by Dr. Charles W. Sult, Jr. for neuro-surgical evaluation, with a tenative diagnosis of cerebral neoplasm, and admitted to Good Samaritan Hospital, Phoenix, Arizona. Ventriculography disclosed a normal ventricular system. Carotid angiography was done on the left side, the side of the questionable tortuosity of the vessels in the scalp and skull, and revealed a circumscribed area of dense staining in the left frontopolar parasagittal area. The tumor was removed and verified to be a *meningotheliomatotus meningioma, measuring* 4.8 x 4 x 2.5 cm., Fig. 1.) The patient recovered and has had no further convulsive seizures. His only handicap now is

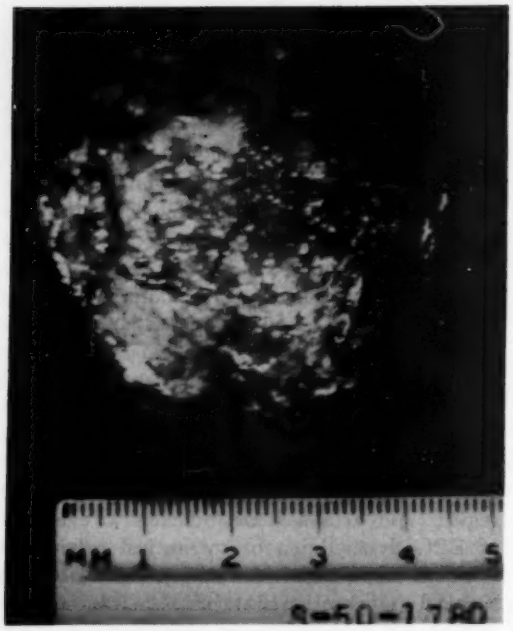

Fig. 1. Meningotheliomatous meningioma removed at operation. This benign tumor was the epileptogenic lesion in a patient who appeared to be normal except for convulsive seizures.

a mild osteoarthritis

The presenting complaint in this case, namely, a generalized convulsive seizure, was correctly surmised by the family physician to indicate so-called "symptomatic epilepsy" because of the age of the patient at the time of the first attack. Specialized neurologic studies did not reveal the cause of the episode until carotid angiography was done, which led to the successful removal of a benign neoplasm at the earliest possible time. Penfield and Erickson(3) have stated that epileptic seizures occur as the initial symptom in approximately 40% of all patients harboring cerebral neoplasms, and if seizures are the first symptoms of a space-occupying lesion, there is a two to one chance that the lesion is relatively benign.

Case 2.

A. O., a 34 year old Mexican housewife, was committed to the Arizona State Hospital on June 29, 1944, with the diagnosis "Epileptic Psychosis."

Early history was indefinite, but it was learned that she had had some type of generalized convulsive seizure at the age of 18 months, without recurrence until she was 10 years of age. The seizure pattern was characterized by mental confusion, a sensation of unreality and

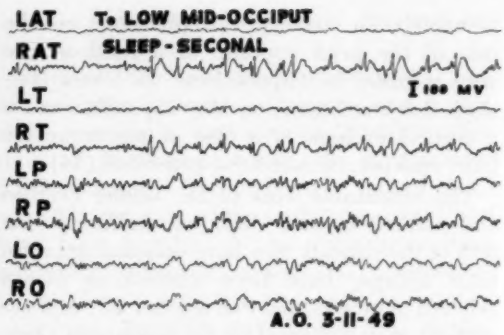

Fig. 2. Localization of right temporal lobe abnormality is confirmed by electroencephalography. Note the high voltage spike discharges in this area, maximal in the right anterior temporal region, during Seconal-induced sleep.

strangeness, staring, undressing, mumbling, chewing, formed visual hallucinations (lions, snakes), negativism, screaming, and occasional outbursts of violence and asasultiveness. She was treated with Dilantin and Phenobarbital, but it was eventually necessary for her family physician to have her committed to the Arizona State Hospital because of the increasingly frequent periods of violence and assaultiveness. It was noted that on admission to the hospital that she was calm, courteous and cooperative. The "psychomotor" seizures gradually increased, leading to suicidal and homicidal attempts, which created the necessity for caring for her on the disturbed ward most of the time.

The patient was referred to the Neuro-Surgical Unit of the Arizona State Hospital for evaluation. The following investigations were made:

(a) *Electro-encephalography* (March 11, 1949) disclosed the presence of a very active spike focus in the right anterior temporal-temporal area, confirming the clinical impression of temporal lobe (Psychomotor) epilepsy, and offering definite lateralization, (Fig. 2.)

(b) *Psychometric studies* (Wechsler-Bellevue Intelligence Scale), showed a verbal scale I.Q. of 54, performance scale I.Q. 67, and full scale I.Q. of 57.

(c) *Physical and Neurological examinations* were normal, except for arterial hypotension and poor oral hygiene.

(d) *X-ray studies of the skull* were normal, except for a metallic fragment in the soft tissues in the right temporal region. (No history could be obtained as to when and how this had occurred.)

(e) *Spinal fluid determinations* were normal.

(f) *Neuro-psychiatric examinations* was made

on August 10, 1949, by Dr. R. E. H. Duisberg. Her general attitude and behavior were marked by emotional lability, negativism, vivid facial expressions and gestures The stream of mental activity was characterized by rambling disgressions, hostility and vituperativeness. There was marked superficial lability of mood. Various studies of the sensorium (orientation, remote memory, immediate recall, counting and calculation, reading, writing, general intelligence, insight and judgment) revealed either complete or partial defectiveness. She was able to sing a little Spanish song of her own. The history of frequent severe outbursts of aggressiveness and assaultiveness during periods of clouded mental states was noted.

(g) *Pneumo-encephalography* disclosed normal ventricular and subarachnoid spaces.

These studies were considered to offer evidence of temporal lobe localization on the right side, with a suggestion that organic pathology would be found. The diagnosis of *Focal Epilepsy of Psychomotor Type* (*temporal lobe epilepsy*) was made, and, following consultation with Dr. F. A. Gibbs, Chicago, surgical intervention was decided upon.

Electro-corticography was done following a right fronto-temporal osteoplastic craniotomy and disclosed firing of high voltage negative spike discharges on the inferior surface of the third temporal convolution 2.8 cm. from the temporal tip, overlying a sharp osseous ridge.

Anterior temporal lobectomy (5 cm. from the temporal tip) followed. The surgical specimen appeared to be grossly normal. Microscopic study disclosed extensive hyperplasia of the pia-arachnoid, but no definite ganglion or glia cell abnormality.

The *post-operative* course was uneventful, marked by lethargy, but no aphasia, agnosia, or other neurologic changes. Within two weeks, she volunteered her services to help the nurses and attendants on the ward with mopping, cleaning and sorting linens and did these chores in a creditable manner.

Neuro-psychiatric evaluation on December 8, 1949, (REHR), 3 months following surgery, found decided changes, described below:

Her general attitude and behavior were much improved, being characterized by calm, neatness of dress, cooperation, pleasantness, and friendliness. The stream of mental activity had changed, and was not increased or markedly retarded, and was without the previous tendency to rambling of thought and speech, and vituperative tirades. Some misrepresentations about herself persisted (i.e. reason for commitment.) She no longer had numerous somatic complaints or felt she was being annoyed. Her affect and mood were characterized by lability, pleasantness, alertness, and of giving the appearance she was going her best with her rather defective intellectual equipment. Various studies of the sensorium showed marked improvement. (Orientation was fairly correct, remote memory was well preserved except for some details, recent memory seemed fairly intact, she could repeat four figures forward tond two in reverse, counting and calculation was not possible due to educational level. She was illiterate but could pick out a few words, she was able to write a little, low intelligence, but improved singing ability much improved, defective insight and judgment, but improved.) Her ward adjustment has been excellent post-operatively. On being called a "dirty Mexican" by a maniac patient, she took it well.

The last communication about this patient was received on May 21, 1951, 20 months following surgery, at which time there had been no recurrence of seizures or of behavioral outbursts, and the patient was reported by her mother to be making an adequate home adjustment.

This example indicates that good results may be obtained with surgical treatment in carefully *selected* cases of psychomotor epilepsy of severe degree under controlled conditions.

Case 3.

M. N., a 23 year old girl, was admitted to Good Samaritan Hospital, Phoenix, Arizona because uncontrollable convulsive seizures of Jacksonian type. Her birth and early development were normal, until she was six months of age, when she suddenly developed convulsive movements of the right hand, spreading to the extremity, side, becoming generalized. These attacks recurred every 3 hours for the next 24 hours and then stopped for a month, only to recur. During such a seizure, when she was two years of age, the intensity and frequency increased to status epilepticus, which was finally controlled at the end of one week. She was left with a paralysis of the right side of the body, mental retardation, and aphasic disorder. She gradually began to speak and to learn to use the left hand during the next year,

becoming ambulant again, but having a typical right hemiparesis. From this time to that of admission to the hospital the seizures would invariably begin in the right thumb and then involve the hand, occasionally involving the right side of the body, and less frequently becoming generalized.

A craniotomy was done elsewhere in 1936, when she was 8 years of age, but no evidence of chronic subdural hematoma was reported, and closure was made.

The child was tutored at home and learned well, although slightly retarded for her age. She was handicapped by the persistence of an infantile type of right hemiparesis, in addition to the focal (Jacksonian) epileptic seizures, which proved to be refractory to large doses of Phenobarbital, Dilantin, Mesantoin,—singly and in combination, and several periods of 72 hours of Barbiturate-induced sleep.

The patient was a brunette with considerable hirsutism. She cooperated well during the examination, spoke clearly, but showed definite evidence of slight mental retardation. There was a marked hemi-atrophy of the right side of the body, a right homonymous hemi-anopsia, and a moderate hemiparesis of the right side with most marked involvement and weakness of the right thumb. Sensation was intact, including stereognostic abilities. She was ambulant, but limped due to the right hemiparesis of infantile type. There was a well healed craniotomy scar in the left fronto-parietal region.

Electro-encephalography on January 11, 1951, showed an active spike focus associated with slow wave activity in the left mid-Rolandic area.

Pneumo-encephalography disclosed a huge porencephalic cyst in the left fronto-parietal region.

On May 19, 1951, the patient was anaesthetized with Sodium Pentothal, supplemented by Nitrous Oxide inhalation and 1% Procaine infiltration of the scalp. A generous incision was made circumscribing the previous one, preparatory to turning down a flap large enough to carry out hemispherectomy if necessary. The dura mater was adherent to the cerebral cortex in the mid-pre-Rolandic area, the extent of one gyrus. This gyrus was atrophic.

Electrocorticographic study (Fig. 3) revealed high potential 2-3/second activity from the cerebral cortex about the cicatrized zone, and spontaneous spike discharges from the gyri just anterior and superior to the gross pathology.

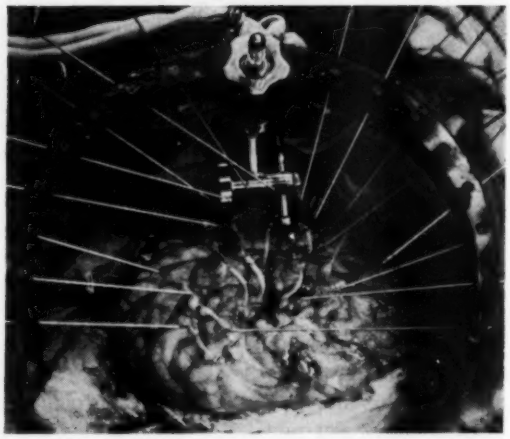

Fig. 3. Cortical electrode assembly (Grass) is clamped to calvarium and direct recordings are made from the accessible cortex (electrocorticography) to aid in the localization of an epileptogenic focus in a patient with unmanageable focal seizures (right hand) associated with a large porencephalic cyst. Note the area of microgyria in the mid-Rolandic region.

It was not possible to accurately delineate the motor area by electrical stimulation.

Local cortical excision. utilizing subpial dissection methods as deep as the porencephalic cavity, was made not only of the atrophic area but also of the adjacent "firing" zone. It was felt that this procedure was less radical than a hemispherectomy, and that the latter procedure could be done later if the seizures were not controlled.

This patient illustrates a common form of focal motor (Jacksonian) epilepsy. The focus was well localized by the seizure pattern, neurologic examination, electro-encephalography and pneumo-encephalography. The pathologic nature of the lesion was suggested by the age of onset of the focal seizures, the hemi-atrophy, and pneumo-encephalogram. Although slightly retarded, she was not debilitated and could not be considered to be a social loss, except for the seizures. The seizures could not be controlled medically. These are the factors that are evaluated in each case prior to surgical intervention. A long term follow-up is required in all cases following cortical excision for focal epilepsy before the final results of such therapy can be evaluated,—a minimum of five years.

SUMMARY

The indications for surgical intervention in epilepsy must be strict, and include the following considerations:

1. Accurate diagnosis by clinical and labora-

tory methods must localize the origin of the seizure pattern to a single area of surgically accessible cerebral cortex, and indicate an epileptogenic lesion in this zone.

2. Symptomatic seizures which are secondary to expanding intra-cranial pathology, i.e., tumors, abscesses, hematomata, etc., require immediate neuro-surgical intervention.

3. Focal epilepsy which is secondary to chronic pathology, i.e., menigo-cortical cicatrices, microgyria, porencephaly, etc., should be managed satisfactorily with drugs in approximately 75% of the cases. Surgical therapy is indicated in patients of the group if intensive medical therapy fails, and if some degree of social and economic rehabilitation can be expected provided the seizures are stopped. The results of surgical therapy of focal epilepsy are generally satisfactory in approximately 50% of this selected group of cases, over a long term follow-up.

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SADDLE BLOCK ANESTHESIA IN OBSTETRICS

PAUL S. CAUSEY, M.D., WALLACE A. REED, M.D., JOHN L. FORD, M,D,*

Phoenix, Arizona

Saddle Block Anesthesia is a type of anesthesia which is used extensively in obstetrical, rectal and genito-urinary work. As the name implies, it is anesthesia limited to the area coming in contact with a saddle. Pitkin(1), in 1928, appears to be the first American to describe this type of anesthesia, but it did not gain favor at first as it was not easily controlled and did not remain localized in the intended segments. It was, therefore, allowed to remain dormant until the early part of 1945 and 1946 when Adriani and Roman-Vega(2) published their work on Saddle Block Anesthesia and its control through the addition of glucose to the solution. With this work there was renewed interest in the subject.

We have the following comment from Parmley and Adriani(3): "The glucose inhibits diffusion and, in addition, causes the solution to be hyperbaric or heavier than spinal fluid. When injected into the subarachnoid space with the patient in a sitting position, the solution gravitates downward and the drug becomes concentrated in the conus of the dural sac." Thus, the concentration surrounding segments higher than the saddle area is lessened, thereby decreasing the effect from complete anesthesia to analgesia. This gives definite relief of pain and sensation in the perineum, relaxes the perineal muscles and provides hypalgesia and analgesia over the legs and thighs without causing paralysis of the muscles of the legs and thighs. As the analgesia extends up to T10-T11 the sensory fibres of the uterus are affected and the pain of labor abolished.

Since the early part of 1947, one of us (PSC)

*From the Department of Anesthesiology, Lois Grunow Memorial Clinic, Phoenix, Arizona.

has been using Saddle Block Anesthesia in Obstetrics, but it was not until January, 1948, that it was decided to use it routinely except where there were definite contraindications. We are presenting 1371 cases in which this type of anesthesia has been used, with complete success in all but three per cent of these cases.

The technique used in this series of cases is that first described by Parmley and Adriani(4) with some slight modifications as follows:

The Saddle Block tray is ready before the puncture is made. A 2 c.c. syringe is used and approximately 0.2 c.c. of Nupercaine(R) (1-200) is drawn into the syringe to rinse out the syringe before preparing the solution for injection. This is very essential as the Nupercaine(R) solution is precipitated by the slightest amount of alkali. Following this, 0.7 c.c. of Nupercaine(R) is drawn into the syringe and to this is added 1.3 c.c. of 10% glucose to make a total of 2.0 c.c. solution. The syringe is then placed on the tray for usage after the lumbar spinal puncture is made The lumbar spinal puncture is made in L3-L4 with a 22 or 20 gauge needle with the patient lying on her side. When a steady, clear flow is obtained, the syringe containing the Nupercaine(R) solution is connected to the spinal needle. A slight amount of spinal fluid (0.1 c.c.) is aspirated to determine that the needle is still in position and then the content of the syringe is injected at the rate allowed by the needle. The patient is then immediately turned on her back and placed in a sitting position with the legs extended for 25 to 30 seconds, then allowed to return to a supine position with two pillows under her head and shoulders. The anesthetic usually starts to take effect immediately and the patient becomes comfortable. The injection must be made between contractions because the spinal fluid pressure is increased at the time of contraction. Currents established in the subarachnoid space during a contraction force the drug into the thoracic region, giving greater distribution of anesthesia and halting labor.

The Nupercaine and glucose is now available in a 2 c.c. ampule which contains 5 mgm. of Nupercaine. This preparation is known as "Heavy" Nupercaine(R)* and we have substituted it for our previous technique of mixing Nupercaine(R) 1-200 with 10 per cent glucose. In using a pre-mixed ampule the entire content is used, after first rinsing the syringe to eliminate the alkali.

(*"Heavy" Nupercaine was furnished through the courtesy of Ciba Pharmaceutical Products.)

One of the changes from the Parmley-Adriani technique is the position used for the lumbar puncture. We have found that there is very little difference, if any, in the level of the anesthesia if the change in position is achieved within 2-3 seconds. One of us (WAR) used the sitting position on the delivery table and the other (PSC) the side position until we could see no difference, and now the side position is used entirely.

Another change is in the dosage. It is apparent that a larger dose has been used in this series.

A third change is to be noted in the length of time the patient is allowed to remain in the sitting position.

The total effect of these latter two modifications of the Parmley-Adriani technique is to raise the level of anesthesia to T-10 in most instances and increase the anesthetic effect. It is our clinical impression that these changes were necessary because of the type of individuals presenting themselves for delivery by this technique in private practice. These patients demand that they feel no pain. Many of the cases mentioned below which required supplemental anesthesia occurred early in the series, at which time the Parmley-Adriani technique was strictly followed. Since the dosage and level have been altered as above, very few patients have required supplemental anesthesia.

The ages varied from 16 to 42 years and the primipara and multipara were about evenly divided. The premedication was decreased somewhat and total dosage usually averaged seconal, grs. 1½; demerol, 150 mgm.; and scopalamine, grs. 1/100. When the primipara were about 8 cm. to complete dilatation the Saddle Block was given. In the multipara, the Saddle Block was given when there was 6-7 cm. dilatation of the cervix.

Saddle Block Anesthesia was discussed with the patient by the attending physician during one of the routine office visits. An attempt was made to answer all questions in order that the patient came to the delivery table in readiness for the block. It should be emphasized that the term "Saddle Block" must always be used

and the word "spinal" avoided as much as possible.

The block usually becomes effective within 2-5 minutes, but in some cases several contractions were experienced before complete relief was obtained. In one case, the block was given in bed and the patient was not relieved of labor pains although the head of the bed was tilted to a slight degree. After a few minutes waiting, it was thought best to take the patient to the delivery room and repeat the block under more ideal conditions. On arrival at the delivery room (about 15 minutes after injection) the patient was again tested and the anesthesia found to be complete, hence we are now willing to wait 10-20 minutes before repeating the block on an apparent failure as there are some few cases in which the anesthetic takes longer to become effective. The reason for this is not clear.

From the time of the injection of the anesthetic agent until the arrival of the patient back into bed after the delivery, all of the patients were able to move their toes and could assist themselves, but commented that they could not tell where their feet were and that the buttocks felt heavy.

There was a slight drop in the blood pressure in the majority of the cases, averaging approximately 10 mm. of mercury in the systolic and very little, if any, in the diastolic. About 5 per cent of these cases required a vasopressor drug. These drugs are routinely given in any case where the systolic drops below 90 mm. of mercury: Oenethyl (50 mgm., intramuscularly or intravenously, depending on the response desired); or Ephedrine, 50 mgm., given in a similar manner, or Neo-synephrine, min. III, intramuscularly. At the beginning of the series, ephedrine, 50 mgm., was used in the skin wheal, but this was stopped as the patients often complained of severe headaches of 5-10 minutes in duration shortly after the start of the anesthetic. This complaint ceased after the use of ephedrine was discontinueud. Now there is no skin wheal made, and the initial puncture with the spinal needle is made when a contraction is present. In four cases it was necessary to give a second dose of vasoconstricting agent, and two cases required the administration of intravenous fluids to maintain the blood pressure at a satisfactory level.

Nausea is still present in some of the cases, but it is seldom considered to be due to the anesthetic. Investigation is now being carried on to see if it is not due to the ergotrate-like drugs used during the delivery, since nausea is most frequent after the ergotrate which was administered intravenously at the time of the delivery of the head. The contractions were slowed for a short period of time in some instances, but these soon returned to normal rhythm without further medication. It was believed that the strength of the contractions was diminished in most cases.

Headaches were encountered no oftener than in the usual spinal tap cases. There were only five cases in which there was a true, severe, "spinal headache," and these lasted from 2-3 days. A one-pound sand bag is routinely placed on the abdomen against the uterus and the patient's head is raised slightly. This procedure has seemed to decrease the incidence, but has not done away with the headache entirely.

In this series, low forceps and episiotomy was the routine, but approximately 75 of the cases had spontaneous deliveries. Some few complained of a light, tugging feeling, but usually the mother was not aware that the baby was born until she heard it cry. It is most gratifying to hear the comments and to see a mother's face when she realizes that her delivery is over and she has had so little pain.

The reported duration of anesthesia in 1028 cases, from the time the block was given until the patient returned to bed after delivery with satisfactory anesthesia throughout, can be tabulated as follows:

76 cases	½ hour or less
461 cases	½ hour to 1 hour
304 cases	1 to 1½ hours
100 cases	1½ to 2 hours
53 cases	2 to 2½ hours
20 cases	2½ to 3 hours
10 cases	3 to 4 hours
1 case	4 hours
3 cases	4½ to 5 hours
1 case	10 hours

Saddle Block was repeated in 24 cases. There was no maternal or infant mortality in the series that could be attributed to the anesthetic or technique of administration.

Adriani explains the occasional complete failure as being due to faulty technique. Apparatus for the administration of oxygen and artificial respiration was always at hand for any emergencies. Oxygen at 5 litres per minute is usu-

ally given to the mother as the delivery starts, but no other measures were found necessary.

In a few recent cases, where the patient complained of the anesthetic wearing off after the delivery has started, we have given sodium pentothal intravenously instead of repeating the block. When sodium pentothal anesthesia is used everything must be ready to complete the delivery, as no more than eight minutes may pass before the infant shows signs of pentothal anesthesia. We prefer that the delivery be accomplished in less time than this, however. It is rare that more than three minutes elapse between the start of pentothal and the clamping of the cord. With the small dosage of pentothal required, the mother is usually awake before the episiotomy is completely repaired. There is no discomfort during the repair procedure as the block anesthesia is still present in the perineum.

This type of anesthetic is very satisfactory in obstetrics. It is, of course, not yet the perfect anesthetic for obstetrics. We believe that it will give the best results for mother and child. The simplicity of the technique and ease of the administration are major factors in its favor. The simplicity means it is an anesthetic suitable for use by the small town practitioner. However, a warning must be given that it is to be used cautiously, and the pitfalls must be fully understood before putting it into practice.

Unusual incidents occuring in some of the cases were:

1. One patient had a massive uterine hemorrhage, requiring immediate blood transfusion, which was unrelated to the anesthetic.

2. One patient had a mild eclamptic convulsion one minute after the anesthetic block, starting while patient was in the sitting position. The delivery was quickly completed following the cessation of the convulsive movements. Oxygen was administered during an uneventful delivery and the patient returned to her bed in good condition. Another convulsion occurred in 45 minutes following return to the room and another one in 15 minuutes. Following this, the patient had an otherwise uneventful postpartum. It is believed that this patient was a borderline eclamptic, and the added amount of ephedrine was just enough to cause the patient to become eclamptic with the above manifestations.

3. One case had a severe headache accompanied by transitory hypertension during and immediately following delivery with relief within an hour as pressure declined.

4. One case had pain during the delivery of the head although the skin anesthesia level was at T10.

In this series of 1371 cases, additional agents were needed due to the expiration of anesthesia or other causes as listed below:

Nineteen cases were given pentothal for delivery of head (16) and extractions of stillbirths (3).

One case was given chloroform for manipulation of a transverse position to a breech with extraction.

Eight cases were given nitrous oxide and oxygen for delivery of the head.

One case was given ether for the delivery.

One case was given pentothal, oxygen and ephedrine for nausea and a fall in the blood pressure.

SUMMARY

Saddle Block Anesthesia is not a new anesthesia; it has been known since 1928. It has been reintroduced for use in obstetrics.

A technique with Nupercaine(R) 1-200 and 10 per cent glucose, and the anesthesia with the newer, pre-mixed "Heavy" Nupercaine(R) is described.

The analysis of 1371 cases of Saddle Block Anesthesia shows that it is a safe, desirable anesthesia in the hands of qualified personnel.

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INFANTILE CORTICAL HYPEROSTOSIS

A Report of Two Cases

H. C. THOMPSON, M.D., H D. COCHRAN, M.D., H. D. WELSH, M.D.
Tucson, Arizona

In 1945 Caffey and Silverman described four cases of infantile cortical hyperostosis,(1) a syndrome characterized by, onset during the first four months of life, tender swellings deep in the soft tissues and, cortical thickenings of the skeleton. This article was followed in 1946 by another by Caffey(2), as well as one by Smyth, Potter, and Silverman(3), describing similar cases. Since them articles have appeared adding other cases. (4, 5, 6, 7, 8, 9). If the diagnosis be limited by strict adherence to the above triad of criteria plu sa fourth later added by Caffey(10), namely, that the mandible must be involved in the process, the total number of authentic cases still is only between two and three dozen. It is the purpose of this paper to present two additional cases, which fulfill all criteria, except that the onset in one case was apparently during the sixth month, and to review briefly the characteristics of the syndrome.

Case I.

P. B., female was born September 1, 1948. Birth weight was five pounds, ten and a half ounces. The pregnancy and labor were normal. The child developed normally for two months, but at the age of three months when she weighed ten pounds, seven ounces, it was noted that she had a purulent left otitis, that her head was asymmetrical, and that she showed definite craniotabes. She had been on five drops of Navitol (R), a vitamin A. and D. preparation since one month of age. Infron (R) capsules, each containing 100,000 U.S.P. units of water dispersible vitamin D. were prescribed, one capsule to be given each month to facilitate the disappearance of the craniotabes. Despite written instructions to the contrary, the mother gave all six capsules of Infron within a period of six days. During the next three months the child was seen five times, on four of which there were signs and symptoms of respiratory infection and mild left caterrhal otitis. Weight gain during this period was three and a half pounds—somewhat less than average. On March 1, 1949, at six months of age, the child was reported to be eating poorly and to be "biting on everything." Physical examination was not remarkable, and though subsequently the mother stated she thought the swelling started prior to March 1st. at this time no swelling of the jaw was noted. Three weeks later, however, on March 22nd the same symptoms were reported, and she had lost one ounce in weight. At this time she had 100.2 temperature by rectum, and there was definite swelling of both jaws. Infantile cortical hyperostosis was suspected, and confirmed by X-ray of the mandible, (Fig. 1) which showed periosteal reaction and new bone formation about the mandible. X-ray study of the complete skeleton showed no other involvement. The urine was normal. The hemoglobin was 9.5 grams, erythrocytes 4.4 million, leucocytes 22,-650, with a normal differential count. The child was tried on a course of a triple sulfonamide preparation for several days, and during the next eight days gained six ounces. However, the jaws seemed to increase in size. Elixir of Pyribenzimine(R), 3 teaspoons a day, were prescribed for a two week period. During this time the child cried hardly at all, ate better, and continued to gain. The swelling of the jaws seemed to diminish. Follow up x-days taken on May 6, 1949 showed the laminated periosteal reaction previously demonstrated was considerably less apparent than on 3-23-49 though there was probably some slight increase in density of the mandible. The frontal projection showed some increase in width of the mandibular hami. There appeared also to be residual soft tissue swelling about the mandible though it was somewhat less than previousiy demonstrated. Though clinical symptoms had disappeared, the periosteal reaction with resulting new bone formation was still present. Following a communication from Dr. Caffey of New York, the administration of Navitol(R) was discontinued for two months. From then on the child continueud to improve, the jaws grew progressively smaller, and by July 27th were felt to be within normal limits. Growth and development continued slightly below average. On December 6, 1949, at the age of fifteen months, the child weighed nineteen pounds, six ounces, and was slightly anemic, the hemoglobin

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Fig. 1. Case I. Lateral Roentgenogram of the mandible at six and one-half months of age, two weeks after appearance of facial swelling. Horizontal rami show laminated periosteal reaction and new bone formation resulting in diffuse increase in volume of bone and sclerosis. There is no destruction.

Figure 2. Note swelling of jaw.

being 10.8 grams. In other ways, however, development was normal. The child has not been seen since that date.

Case II.

P. C., male was born November 12, 1950. Birth weight was six pounds, seven ounces. Pregnancy, labor, and delivery were normal. The child was breast fed for five weeks, and then put on a routine evaporated milk and Dextri Maltose (R) formulua. Abdec (R) 3/10 of a cc. daily was commenced at the age of one month. The child was first seen in the office on January 10th at two months of age, weighing nine pounds, three ounces, with a complaint of fever and diarrhea. Sulfadiazine was prescribed. The fever disappeared, but not the diarrhea. One week later the child was placed on boiled skim milk, aureomycin, and later streptomycin. On February 1st the weight was ten pounds, two ounces, and the child was having two very loose stools daily. Culture of the stools showed Salmonella. Over a period of the following two weeks the diarrhea gradually ceased. The child was next seen on March 6, 1951 at the age of four months, with a complaint of swelling and tenderness of the left parotid area. Rectal temperature was 102 degrees. This was tentatiely diagnosed as mumps, and aureomycin was prescribed. Six days later the firm, very tender swelling had extended to include both sides of the face. (Fig 2) The liver was slightly enlarged. The hemoglobin was 8.5 grams, the erythrocytes 3.8 million, leucocytes 16,100, with a normal differential. Penicillin was prescribed as a nonspecific infectious parotitis was suspected. Four days later the swelling was still present, and infantile cortical hyperostosis was diagnosed. X-ray examination on March 21st (Fig. 3) showed double cortical margins of the inferior cortices of the horizontal rami of the mandible. Some soft tissue swelling in parotid and submaxillary regions was apparent. Though the density of the mandible was only slightly increased, and the usual laminated appearance was not obvious, it was felt that this was infantile cortical hyperostosis involving the mandible. X-rays of the remainder of the skeleton showed no further involvement by the disease process. In the six weeks following diagnosis the child gained normally and the swelling slowly diminished, though on April 24th the mandible still felt enlarged. Tenderness had disappeared by

Fig. 3. Case II. Roentgenogram of the mandible at four months of age. There is laminated new bone formation with diffuse thickening and sclerosis together with soft tissue swelling. Mandibular involvement has been present in all cases reported to date.

April 24th. X-ray on that date showed slight improvement in the process.

DISCUSSION

Both these cases have certain features in common. The disease appeared between the ages of four and six months. Both children had a low grade fever, leukocytosis, with normal differentials, and a tender painfuul swelling of the face, which failed to respond to antibiotic therapy. In each case there was a preceding history of infection. In the first the infection was upper respiratory with otitis; in the second Salmonella enteritis. The first case was complicated by the inadvertent administration of 600,000 units of vitamin D. within a period of six days. This administration was approximately three months prior to the clinical diagnosis of hyperostosis, and its significance is doubtful. In both cases the child made an uneventful recovery. In the first case the improvement incidental to the administration of an antihistamine is of interest, but doubtful significance.

The etiology of the disease remains obscure. There is, however, a growing mass of evidence which effectively excludes many possibilities. During the course of investigation by various authors, such things as syphilis, tuberculosis, blood dyscrasias, scurvy, rickets, hypervitaminosis A., typhoid, paratyphoid, Brucellosis, bacterial, ricketsia, or viral infection, and allergy have been excluded by laboratory tests or therapeutic failures, as possible etiological agents. Hypervitaminosis D. particularly interested us in view of our first case, but search of the literature on the subject fails to reveal any confirmation that large amounts of vitamin D. can produce the syndrome. Hypervitaminosis D. results in a generalized osteoporisis and metastatic calcifications occurring in almost any organ or tissue of the body, but especially frequent in the periarticular structures(11). This is quite a different roentgenologic picture from that described in infantile cortical hyperostosis.

It has been speculated that hyperostosis in the early age group may represent an unusual reaction to infection, and the low grade fever and leubocytosis may be advanced to support this theory, which remains, however, still unproven. Infection apparently preceded the hyperostosis in only seven of twenty-three cases reported in the literature.

Caffey has recently asserted that the age of onset is invariably during the first four months of life, one case having shown typical signs on the first day of life.(10) Our first case probably started during the sixth month, and there seems no reason to doubt that cases may commence this late. There is no predominance of either sex. The presenting symptoms are usually irritability, fever, and a brawny swelling of the face. There was a striking similarity in the facial appearance of our two cases and, indeed, they resembled the pictures of the other patients so much that all could be siblings.

The fever is variable, though usually low grade. It may suubside in a few weeks or persist for months. The irritability seems to be due to the pain experienced when the affected parts are moved. When undisturbed, the babies usually remain placid and content. The areas of actual swelling are quite tender, necessitating only a slight stroking of the skin to produce a cry of pain.

The site of the soft tissue swelling is usually that of the cortical hyperostoses, and as these vary from place to place in the individual there is no uniformity as to their location, with the exception that the jaws are always involved. Small hyperostoses may occur without the presence of soft tissue swelling. The soft tissue

swelling may be present for some time before the bony involvement is noticeable, and roentgenographically may appear in successive new sites, while the earlier swellings in another site are disappearing. There may be one or more recurrences of the swelling occurring as long as several weeks after their initial disappearance. Recurrences tend to be milder and of shorter duration than the initial occurrence. Bony lesions persist long after external signs and symptoms have disappeared.

The cortical hyperostoses are most commonly found in the mandible, clavicle and ribs. Other sites include the scapula, calvarium, and all the tubular bones, excluding the phalanges.

The basic roentgen change is an external thickening of the cortex, which in many instances was laminated, giving an onion peel appearance. The external margins of the cortical swellings are irregular. These cortical thickenings do not extend the entire length of the bone, but leave the terminal segments of the shaft unaffected. The spongiosa, the metaphyses, the epiphyseal plates and ossification centers in the epiphyses all are normal. Biopsy of the bone disclosed only hyperplasia of normal lamellar bone.(6) There was no evidence of old or recent inflammatory changes, nor were subperiosteal hemorrhages present. Muscle biopsies showed some vacularization and degeneration of muscle fibres with brosis.

There is usually a leukocytosis ranging from 12,000 to 28,000. Some authors report a moderate increase in lymphocytes, others a polymorphonuclear reaction. A moderate increase in sedimentation rate is usually found some time during the course of the disease. Blood calcium, phosphorus and phosphatase levels have not varied consistently or greatly from normal.

Differential diagnosis of the swelling includues mumps, infections and neoplasm of the parotid glands, and leukemia. The irritability is suggestive of scurvy. The lesions of the bones suggest osteomyelitis or neoplasm. The most common error occurring in the literature, as was the case in Caffey's two earlier articles, (1, 2) was the inclusion of cases occurring after the twelfth month of life. These Caffey now believes to be hypervitaminosis A. This latter condition does not show mandibular involvement or fewer and does have increased vitamin A. levels and frequent metatarsal hyperostoses, whereas the opposite is true in infantile cortical hyperostosis. It is well known that the giving of excessive vitamin concentrate during the first four months of life has not produced the manifestations of infantile cortical hyperostosis. Indeed, from the proven cases of hypervitaminosis A. it was apparent that the vitamin must be given not only in large amounts, but also over a prolonged period of time in order that the syndrome be produced.

Treatment of infantile cortical hyperostosis is at the present writing largely expectant. Sulfonamides and antibiotics have been unsuccessful. The apparent good results with pyribenzamine (R) in our one case were not confirmed when Benadryl (R) was tried in others, in the literature. Specific therapy must probably await demonstration of the true etiology. Recovery with disappearance of all swelling within a few months is the rule.

SUMMARY

Two cases of infantile cortical hyperostosis, involving the mandible have been presented. Hypotheses regarding etiology and the characteristics of the disease have been discussed.

Since this article went to press a third case involving only 1 side of the mandible has been studied by us.

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GALLBLADDER SURGERY AT ST. JOSEPH'S HOSPITAL A STATISTICAL AND COMPARATIVE REVIEW

DAVID C. JAMES, M.D.

Phoenix, Arizona

In reviewing all gallbladder surgery in a private hospital performed in the year 1950, it occurred to the author that it might be of general interest to compare such a study with statistics from a large well-recognized hospital or clinic group. A search of the literature revealed few articles concerning a comprehensive survey of gallbladder surugery, although there was a great variety of articles covering certain details or aspects of gallbladder surgery. Fortunately an excellent review was found from the Lahey Clinic to serve as a basis of comparison. This was an article by Adams and Stranahan entitled "Cholecystitis and Cholelithiasis, an Analytical Report of 1,104 Cases," appearing in Surgery, Gynecology and Obstetrics, Volume 85, Page 776, 1947. The reader is referred to this article for details and a most comprehensive bibliography. For the purposes of this paper the format will follow closely that used by these authors.

ETIOLOGY

The review of this series of gallbladder cases contributes nothing to the etiology of gallbladder disease as we now know it.

INCIDENCE

During the year 1950, 121 patients were operated at St. Joseph's Hospital, Phoenix, Arizona, for various types of gallbladder disease and with various types of operative procedures. Of this group 92 (76 per cent) were between the ages of 31 and 60. Of the Lahey group 831 (75 per cent) were in the same age group. The youngest patient operated at St. Joseph's Hospital was 18 years of age as contrasted with a patient 9 years of age operated at the Lahey Clinic. In both series the oldest patient was 81 years of age. The average age of the St. Joseph's group was 47.5 years; the Lahey group did not state an average.

Twenty males and 101 females were operated at St. Joseph's. This is a ratio of approximately 1 to 5. The ratio of the Lahey group was 1 to 3. The race incidence was 120 whites to 1 colored. This incidence is statistically of no signficance.

The average stay in the hospital of this group of patients was 12.1 days. The shortest stay was 6 days; the longest 66. The average number of postoperative days was 9.9. The shortest postoperative course was 4 days; the longest 29. The longest stay and longest postoperative course occurred in an elderly male who was admitted for an acute coronary thrombosis and developed an acute gangrenous cholecystitis while in the hospital for that disease.

Using the highest temperature as an index of morbidity, the average highest temperature was 101.3 degrees F. The average day on which this highest temperature was reached was 2.1 days. There are no comparable figures in the Lahey report.

SYMPTOMS AND SIGNS

Symptoms were present in 3 cases for 20 years. The shortest duration of symptoms was 1 day occurring in 2 cases. The average duration of gallbladder symptoms of all types in all cases was 20.7 months. In 22 cases the exact duration of the disease was not specified in the history. One patient had had a previous cholecystostomy 7 years prior to surugery, and another 15 years prior to surgery. The history was refused the intern in 1 case.

JAUNDICE

Twenty-three patients (19 per cent) gave a history of previous jaundice or were jaundiced on admission. This compared with 18 per cent in the Lahey group. Sixty-two patients (51 per cent) denied jaundice and other obstructive signs such as dark urine and alcoholic stools in the past. In the history of 36 patients, obstructive signs were not mentioned. Five patients had common duct stones proven by operation; three gave a history of jaundice, 2 did not. Common duct stones were not found at operation in 18 of the 23 patients giving a history of jaundice. Adams and Stranahan state in their report that "200 patients gave a previous history of jaundice or had jaundice on admission to the clinic. Jaundice was present in 95 (51 per cent) of the 186 cases in which common duct stones were removed, and in 105 (52 per cent) of the jaundiced cases common duct stones were not found at operation. One hundred eighty-six

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had proved common duct stones, but almost one-half (89 or 47.8 per cent) of these patients with common duct stones did not have jaundice." In the St. Joseph's group 3 patients underwent common duct exploration in whom jaundice was denied and in whom no stones were found. One case in whom jaundice was not mentioned in the history revealed no common duct stones on exploration.

PHYSICAL FINDINGS

The group under consideration was described as completely negative on abdominal examination in 29 or 24 per cent of the cases. Tenderness in the right upper quadrant was elicited in 91 or 75 per cent. A palpable mass was definitely described in 6, a questionable mass in 4, and no mass in the gallbladder region was described in 111 cases. This is consistant with the post-operative diagnosis of only 9 acute cases since a chronic retracted gallbladder would hardly be expected to be palpable. Enlarged liver was described in 2 cases, jaundice in 2 and an elevated icterus index was found in these 2 patients.

ROENTGENOLOGIC EXAMINATION

Oral cholecystographic examination of the gallbladder was done prior to surgery in 91 or 76 per cent of the 121 cases. In 1 case cholelithiasis was discovered during the exploration at a previous operation. In the histories of 29 of our patients cholecystography was not mentioned. The Lahey group had cholecystography in 92.4 per cent of the cases. A correct radiological diagnoses was made in 85 or 82 per cent of the present series. This compares with a correct diagnosis of 98 per cent of those in the Lahey group having radiological examination prior to surgery. The number of patients actually having X-ray studies in this series was probably higher, but was not mentioned by the intern in taking the history. The correctness of diagnosis would also probably be higher accordingly. In 52 of our patients (57 per cent) stones were visualized, comparing with 62 per cent of the Lahey Clinic group. Non-functioning gallbladder was described in 24 cases (20 per cent), a poorly functioning gallbladder in 2, redupulication of the galbladder in 1, and in 12 histories X-ray studies were mentioned but conclusions were not specified.

OPERATIVE TECHNIQUE

A vertical incision was employed in 51 per cent of the series studied, some modification of the subcostal or transverse incision in 48 per cent, and a Mayor incision was used in 1 case.

Penrose drainage was used in 76 or 62 per cent of our cases. T-Tube drainage was employed in 8 and a small urethral catheter drain in 8. The wound was closed without drainage in 30 or 25 per cent of the cases studied, but in each such case hemostasis was described as being practically complete.

OPERATIVE FINDINGS

Adhesions were described in 56 or 46 per cent of our cases. Cholelithiasis was proven by operation in 85 or 70 per cent. Common duct stones were found in 5 cases, a gangrenous gallbladder in 2, cirrhosis of the liver was described in 2, hydrops of the gallbladder in 1, and the gallbladder was not described in 2 cases.

SURGICAL ACUMEN

Table I shows the various preoperative, postoperative and pathological diagnoses.

It is to be noted that the term "lymphocytosis" employed in this table signifies the description on the part of the pathologist of "focal areas of lymphocytes' which for all intents and purposes is a diagnosis of a normal gallbladder. It is to be kept in mind however, that other conditions may be present producing gallbladder symptoms than an out-and-out anatomical disease of the gallbladder as such. For instance, cholecystic dyskinesia has no pathological counterpart and a gallbladder removed in such a condition would not necessarily show any pathological changes. However, cholecystectomy would cure a patient suffering with such a diagnosis. Similarly, cholesterosis would be a purely pathological diagnosis unless the surgeon wished to confirm his preoperative and postoperative diagnosis at the time of operation by opening the gallbladder himself. The lack of confirmation of choledocholithiasis by the pathologist is fallacious since the pathologist presented only with stones as such would have no way of knowing their origin. No direct conclusions may be drawn from this table except that one gets the impression from a study of it that the preoperative, postoperative and pathological diagnosis in this series of patients correlates with a fair degree of accuracy.

OPERATIVE PROCEDURES

Cholecystectomy alone was performed in 107

TABLE I

Diagnosis	*Preoperative*	*Postoperative*	*Pathological*
Acute Cholecystitis	6	5	1
Acute Cholecystitis with Stone	4	4	1
Chronic Cholecystitis	30	25	10
Chronic Cholecystitis with Stone	77	80	84
Choledocholithiasis	3	5	1
Lymphocytosis	0	0	19
Cholesterosis	0	0	6
Aucte and Chronic Cholecystitis with Probable Stone	1	0	0
Acute and Chronic Cholecystitis	0	1	0
Chronic Cholyecystitis with Hydrops	0	0	1
Chronic Cholecystitis with Abscess	0	0	1
Cyst of Gallbladder	0	1	0
Carcinoma of Gallbladder	0	0	1
Gangrenous Cholecystitis	0	1	1
Cholecystic Dyskinesia	0	1	..
Empyema of Gallbladder	0	3	0
Pain Right Upper Quadrant	1	..	..
Common Duct Obstruction	1	0	0
Postoperative Leakage	0	1	..
Chronic Appendicitis	1	1	2
Subacute Appendicitis	1	1	0
Renal Calculus	1	0	..
Cirrhosis of Liver	0	1	0

or 88 per cent of our cases. Fifty-three per cent of the Lahey group had cholecystectomy alone. Cholecystectomy with choledochostomy was performed in 11 or 10 per cent of the St. Joseph's group. Exploration of the common duct with cholecystectomy was performed in 41 per cent of the Lahey group. It is to be kept in mind that the patients seen in a large, regionally and nationally famous clinic would be expected to present more difficult and more complicated surgery because such patients would tend to gravitate to such a clinic. The higher incidence of exploration of the common duct in the latter group would be expected accordingly. Also the criteria for exploration of the common duct as employed by the Lahey Clinic and described by Adams and Stranahan are as follows: (1) frequent acute attacks of biliary colic, chills or fever, (2) past or present history of obstructive jaundice or laboratory signs thereof, (3) dilated or thickened common duct, (4) multiple small stones in the gallbladder. (5) unsatisfactory or suspicious findings on palpation, (6) sediment in aspirated bile from the common duct, (7) non-calculus gallbladder with biliary tract symptoms, (8) small contracted gallbladder, (9) acute or subacute pancreatitis or hepatitis. It will be seen by the reader that these criteria for choledochostomy cover a much broader spectrum than are generally employed and therefore would increase the percentage of common duct explorations i nthe Lahey Clinic group. In two of our cases cholecystostomy was performed comparing with 6 cases or 0.45 per cent in the Lahey series. Both of the cases in our group undergoing cholecystostomy were poor risk elderly patients. A partial cholecystectomy was performed in 1 case necessitated because of operative or technical difficulties. As incidental procedures, appendectomy was performed in 25 (21 per cent) of our series, biopsy of the liver in 1, ventral herniorrhaphy in 1, and anterior colporrhaphy in 1 case. Four hundred or 36 per cent of the Lahey group had incidental appendectomy.

ANESTHESIA

General anesthesia was employed in 102 cases or 84.3 per cent, spinal anesthesia in 3, spinal anesthesia plus pentothal in 6, local infiltration in 8, and general plus intercostal block

in 2. There are no comparable figures in the report of Adams and Stranahan.

CONCURRENT DISEASES

A number of different complicating diseases were encountered in this series, although there were very few cases in each type. One patient was a severe cardiac. One patient was admitted to the hospital with acute coronary thrombosis and developed an acute gangrenous cholecystitis while under treatment for this complaint. A cystocele was found in 1 case, an incisional hernia was present in 1, and one patient had diabetes mellitus which was under control upon admission. One patient had chronic hepatitis. An adenocarcinoma of the gallbladder was found in 1 patient upon examination of the excised specimen. Three cases or 0.3 per cent in the Lahey group were found to have adenocarcinoma of the gallbladder.

POSTOPERATIVE COMPLICATIONS

Ten patients of the 121 had some type of postoperative complications, mostly minor. There was 1 case each of superficial wound infection, thrombophlebitis of the left leg and urinary cystitis, pneumonitis with atelectasis and bundle branch block, paroxysmal auricular fibrillation, severe headache requiring neurological consultation, and 1 patient who had a postoperative external biliary fistula which was reoperated within 34 days of her initial operation. Although not strictly a complication 5 patients were discharged with T-Tubes in situ in the common duct. There was 1 fatality. The other complications of cholecystic disease such as pancreatitis, benign strictures of the bile duct, internal biliary fistulas and postcholecystectomy syndromes as described by Adams and Stranahan were not encountered in the present small series.

ANALYSIS OF DEATH

The one death in this series occurred in a 49 year old white female who was admitted to the hospital with a history of three months duration. She had been jaundiced on one occasion prior to admission and was jaundiced but with out pain at the time of admission. Cholecystograms revealed a non-functioning gallbladder and an Upper G-I Series showed a dilated duodenum. On physical examination the patient was deeply jaundiced, presented a large liver and a mid-line mass which was not definitely identified preoperatively. The icterus index was markedly elevated in this patient. The preoperative medical diagnosis was carcinoma of the head of the pancreas or possible carcinoma of the gallbladder. The surgeon called in consultation made a diagnosis of common duct stone. The latter diagnosis was found to be correct upon operation in which a choledochostomy and cholecystectomy were performed. The patient had a very uneventful postoperative course until the fifth postoperative day when she suddenly went into shock, presented signs of marked hemoconcentration and in spite of very adequate and vigorous treatment expired. The medical opinion as to the cause of death was acute adrenal insufficiency. Necroscopy revealed marked ileus and changes in the adrenal gland consistent with the medical diagnosis of adrenal depletion.

SURGEONS AND OPERATIONS

This series of 121 cases were operated by a total of 27 different surgeons. The largest number of cases operated by any individual was 19. Seven surgeons performed 1 operation each.

CONCLUSIONS

No broad conclusions have been attempted in this review. However, all gallbladder surgery in a private hospital done by a number of different surgeons of different qualifications, background, and training, have been presented. A total of 121 patients underwent surgery. A total of 122 operations were performed with 1 death or a mortality of less than 1 per cent. It is the opinion of the author that the manner in which these patients were handled from the surgical point of view compares very favorably with the results obtained in a large nationally famous clinic group.

BASIC *Science* SEMINAR

PHYSIOLOGY OF SHOCK WITH SPECIAL REFERENCE TO ETIOLOGY AND THERAPY

Physiology of shock with special reference to Etiology and Therapy.
(excluuding lower nephron nephrosis)

A. S. OZBEY, M.D.
Pima County General Hospital, Tucson Medical Center, St. Mary's Hospital

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Introduction:

Acute circulatory failure was first described by Le Dron in France, in 1745, as a clinical entity resulting from trauma and characterized by peripheral arterial spasm, capillary stagnation and general circulatory insufficiency. But, it was not until 1765 that the term "shock" began to appear in medical literature. It is generally accepted that James Lotta of Scotland was the first to use the term "shock."

The literature on shock is volumnious. Experimental physiology and clinical observations particularly on the traumatic shock during and since the first and second world wars have contributed considerably to put some light on this complex subject. This paper intends to summarize the literature with special emphasis to etiology, pathogenesis and therapy.

Definition of shock:

The term "shock," today, is practically applied to all types of acute peripheral circulatory failure, regardless of cause or multiplicity of causes. Just as there are many causes of fever, so there are many causes of shock. To use descriptive terms in association with the word shock, such as shock following hemorrhage, shock associated with peritonitis would probably clarify the complexity.

Various syndromes characterized by a sudden depression of cellular function not accompanied by circulatory insufficiency also are called shock. Insulin shock is a good example of this group. They will not be included in this paper. Shock caused by myocardial failure and pericardial tamponade will also be excluded from this discussion. The role of myocardium, however, will be discussed in pathogenesis of shock.

It has been customary to speak of a primary and a secondary shock. A distinction has been made by many writers between primary and secondary shock: though they are not in agreement as to what contributes or causes the two forms. Most of them define primary (early) shock as an immediate or early response to trauma on a neuro-psychic basis; pain and emotional factors (such as great fear) playing an important role by causing reflex vaso-dilatation and decrease in relative blood volume, and a profound fall in blood pressure.

Recovery from the primary shock may be quite prompt, but if it prolongs it may develop into the secondary shock, which is the kind usually seen in the severely wounded or following serious or prolonged operations.

The acute peripheral circulatory failure which follows 3-4 hour or later after a severe tissue injury is called secondary shock or "delayed shock."

Pathological Physiology of Shock:

The appearance of a person in shock is characteristic. He lies quite still, apparently unconscious of his surroundings, but can answer questions slowly and correctly. The face is pale and gray, drawn and anxious, and the skin is cold, the temperature is subnormal, the pulse is feeble and rapid, the respiration is shallow.

Gregersen and Root have demonstrated that the signs which are shown by man in traumatic shock can be reproduced experimentally in dogs with the exception of sweating. In experimental shock in dog and clinical shock in man, thirst is present and ingested food particles are usually vomited.

In the experiments on the production of shock, it was found that shock could be produced by severe hemorrhage; repeated small hemorrhages; sufficient trauma to muscles; severe burns; crush injuries and by the application of a tourniquet.

When the chest of an animal in deep shock is opened the heart is found to be beating vigorously. The heart cavities are not completely

filled. The venous pressure is low, the cardiac output reduced. Marked reduction in the circulating blood volume is found. The systolic B.P. may be no more than 60 mm HG.

Although early B.P. readings may be within normal ranges due to compensatory vasoconstriction in hemorrhagic shock, but in general, there is a fair correlation between the B.P. readings and the severity of blood loss.

Systolic B.P. Readings	Loss of % total blood vol.
→100 mm Hg.	15%
80-100 mm Hg.	25%
←60 mm Hg.	35-40%

B.P. in shock due to burns may be normal or elevated.

Slowing of the peripheral blood flow and reduction in the cardiac output occur early in shock and precede the fall in B.P. Therefore, it can be said that routine checking of the systolic B.P. is, in itself, of no value in determining the impending onset of shock, by the time patient's B.P. is lowered significantly, it being a late sign, shock is already present.

Haemoconcentration:

This is a significant feature of shock. Haemoconcentration is extreme in degree in burn shock and occurs as a result of plasma lost from the burned surface and the tissues surrounding the burn. In an intensive burn, 70% of the total plasma volume may be lost from the circulation within a few hours. The shock state following burn is attributed largely to the reduction in blood volume and to the increased corpuscular concentration of the blood.

As to the mechanism of haemoconcentration in delayed traumatic shock, it is not well known. The theory that the leakage of plasma from the capillaries could possibly occur as a result of an undue permeability of capillary wall has not been proved. The question whether long continued anoxia is causing increased permeability of capillaries anywhere in the body, has been subject to experiments. Fine and his co-workers, by tagging the plasma proteins with radioactive material so as to make their identity unquestionable, showed that the general capillary leakage does not occur. They favored another theory instead, namely the theory of pooling or "tapping" of the blood in the peripheral vascular bed so keeping large amounts of blood out of circulation. This theory has been given support by the findings of marked congestion of the mesenteric vessels in shocked animals. Indeed, in post-mortem examination of a shocked animal or person, the liver and gastro-intestinal tract are intensely congested, the walls of the intestines are edematous and show petechial hemorrhages.

Erlanger gives further support to this conception by describing the packing of corpuscles in the dilated capillaries of the intestinal villi in shock. Mann found that, whereas about 24% of the blood volume of a normal animal is held in peripheral vascular areas and the remaining 76% in the heart and larger vessels, in shock 61% was trapped in the peripheral vessels. This 61% of whole blood volume is out of general circulation. So it is quite clear that any great enlargement of the capillary bed would alone reduce circulating blood volume effectively enough to cause marked reduction in the venous return and consequently cardiac output, thus causing a physiological vicious circle. After a critical point has been passed in diminishing cardiac output, lowered B.P. and reduced blood volume, progressive oligemic anoxia of the tissues leads metabolic changes and damage to certain vital organs such as liver, kidneys, heart and brain. The liver seems to play an important role in shock. Fine, Seligman and Frank recently reported a most interesting series of experiments in connection with the part played by liver. In dogs, they established an anastamosis between the aorta and portal vein by using a vessel graft and then these dogs were put in shock by bleeding them from the carotid artery until their systolic B.P. were stablized around 50 mm. Hg. Under these circumstances, the pressure in the portal vein still remained higher than of control animals. Shock in these dogs with aorta-portal anastomosis appeared to be reversible—7 out of 8 dogs survived while 15 out of 17 control animals died of shock.

This protective effect of aorta-portal anastomosis is due to improved blood flow through the liver, consequently better oxygenation of the liver. According to the hypothesis, normally oxygenated liver detoxifies or inactivates the depressor principle which is found in the blood stream of shocked animals.

Kidneys are also affected seriously by anoxia which causes injuries to the renal cells resulting in the condition called the "lower nephron syndrome" which will not be included in this discussion.

As to the heart, Wiggers believes persistent low B.P. and anoxia damages myocardium and he has found that cardiac output is rarely restored fully after transfusion.

Opdyke and Foreman showed that during standardized hemorrhagic shock in dogs coronary flow decreased to 30-60% of control flow during the 50 and 30 mm. Hg. hypotension periods and flow resistence was greatly decreased. Vasodilatation appeared to play a prominent part in the decrease in resistence.

During shock important changes take place in the blood. The slowing of the blood flow is accompanied by a decrease in 0_2 consumption and progressive decreases in ph and arterial CO2 content and progressive increases in the concentration of lactate and phosphate; there are slight increases in pyruvate and sulfate, and the base bound by protein is reduced. Elevation of the Lactic and Pyruvic acids and the rise on the L/P ratio in hemorrhagic shock results from the predominence of anaerobic over aerobic carbohydrate metabolism, especially in muscles, in the presence of peripheral circulatory failure. In this situation, energy is derived from glycolysis where the end product is lactic acid.

A rapid return toward normal of blood Lactic and Pruivc acids and L/P ratio follows transfusions.

Seligman, Frank and Fine also showed that the disappearance of injected glucose from the blood was poor during the hemorrhagic shock. This was the same with pyruvic acid. Following transfusions clearance of both substances was found to be normal.

Blood potassium has been subject to special studies with the purpose to find out if hyperpotassemia is responsible for cardiac death in shock. According to the recent investigation, potassium in blood seldom exceeds 8 mm per liter, a level at which they noted only minimum EKG changes. According to Winkler and Hoff, it is exceptional for death to be caused by cardiac arrest resulting from potassium auto-intoxication. It is believed that potassium may reach toxic levels in only final stages of shock.

No changes have been reported in blood Na. or Ca.

STAGES OF SHOCK

Davis has divided circulatory failure into five stages:

1. Primary (early shock):

Primary shock does not involve a reduction in blood volume necessarily. It usually appears shortly after trauma, particularly if much pain is associated with it. The skin becomes cold, clammy and pale, sweat appear on the face and patient is in typical shock. Spontaneous recovery usually takes place quickly if responsible cause (pain or fear) is eliminated.

2. Impending secondary (delayed) shock:

½ to 12 hours after the primary insult impending secondary shock may occur. Patient may appear quiet, talkative or extremely restless. During this period the B. P. may be within normal limits or even elevated. The pulse may be 60 to 150 beats per minute. This is a transitory phase and the peripheral circulation is still in compensation.

3. Decompensated secondary (delayed) shock:

This is the decompensation phase of the shock and its significant physical sign is the low B.P. There is a fall in both systolic and diastolic pressure with a reduction in the pulse pressure. Pulse rate is increased to 100 to 200 beats per minute. The diastolic pressure may be so low that it cannot be determined. Arteriolar-capillary rate may be delayed to 15 seconds or more.

4. Pseudo irreversible shock:

This is midway between decompensated and irreversible shock. Appearance of the patient is like in the irreversibie shock. But the difference is in the fact that the circulatory failure can still be corrected if sufficient amount of blood is given.

5. Irreversible shock:

By irreversible is meant the unfavorable response to transfusion which follows the 90 minutes period of hypotension in 50 mm Hg. systolic B.P. and 45 minutes in 30 mm Hg. systolic B.F. in experimental shock. Acidosis also develops during this hypotension period. There are certain definite signs which indicate irreversible stage of shock: continuous low B.P. in spite of apparently adequate transfusions, greatly increased puluse rate, Cheyne-Stokes breathing, severe mental depression, continuous cold clammy skin and cyanotic nail beds. All these indicate the final stage of shock prior to death.

ETIOLOGY OF SHOCK

Many theories have been advanced in attempts to explain the genesis of the shock state. These theories will be mentioned here briefly before further discussion of the subject.

1. Inhibition theory:

It was tried with this theory to explain shock

as a result of the predominence of the inhibitory side of organ and tissue function induced by injury.

2. The theory of vaso-motor paralysis:

According to this theory, following injury there is a marked reduction in vascular tone resulting from the stagnation of blood in the abdominal viscera.

3. The Exhaustion theory:

Is based upon exhaustion of the vaso-motor and other vital centers as a resulut of over-action of these centers following psychic, traumatic, toxic or thermal stimuli.

4. The "fat embolism" theory.

Stated that the main cause of the findings in shock were emboli of fat to the brain, lungs and other organs.

5. The theory of "adrenal hyperactivity" blamed hyperfunction of the glands for causing the onset of shock.
6. The "adrenal exhaustion' theory blamed adrenal failure.
7. The "acidosis theory" which believed that the blood pressure fell because of a lowered alkaline reserve.
8. The "acapnia theory" which with it was tried to explain the diminished venous return. According to this theory hyperpnea occurred first, then acapnia, then failure of the vaso-pressor mechanism, then tissue asphyxia.
9. The "vaso-constriction and capillary congestion" theory which stated that increased hydro-static pressure because of the stasis in the veins caused extravasation of serum into the tissues.
10. The theory of "traumatic toxemia":
    The toxins produced by the injured tissues cause acute circulatory failure.
11. The theory of the "actual loss of red cells and plasma":
    Acute circulatory failure is caused by losing blood into the injured tissues.

It is clear that some of these theories deal more with the mechanism of shock than with its cause. Theories dealing with etiology can be reduced to three:

1. Toxemia Theory
2. The theory of local fluid loss
3. Shock of nervous origin

1. *The Toxemia theory of shock*:

This theory was originally based on the hypothesis that the main features of shock were due to the action of a histomine-like depressor substance formed through the destruction of tissue, especially of muscle.

It has been known since 1919 that when injected into animals in doses of 1 mgm. per kilogram of body weight, histamine produces shock-like features via its depressor effect upon the circulation, namely, a fall in blood pressure due to peripheral vascular dilatation. Furthermore, in experimental anaphylactic shock in dogs it has been shown that during the period of sensitization following a foreign protein injection the histamine content of the liver of sensitized animals is increased. However, when these dogs are re-injected with the same foreign protein after an interval of 12 or 14 days and shock produced the histamine content of the liver is reduced below normal.

Bayliss and Cannons' experiments seemed to prove the toxemia theory of shock in which a histamine-like substance, or histamine itself, was the responsible agent. These observors crushed the limbs of animals and reported that a fall in B.P. did not result so long as the vessels of the injured part were occluded, though the nerve trunks remained intact. Upon restoring the circulation a fall in B.P. occurred. On the other hand when they cut the nerves, leaving the circulation a fall in B.P. occurred. On the shock could not be prevented.

Other experimental physiologists who have repeated Cannon and Bayliss' experiments have not been able to obtain the same results. Besides this, attempts have failed to isolate a toxic substance from traumatized tissues; and extracts of these tissues have been injected into normal animals with no production of shock, blood from shocked animals has been injected into the veins of normal animals without harm; one shocked animal has been transfused with blood from another shocked animal with benefit.

The question of a toxic factor in burn shock is confused for the reason that a distinction has not always been drawn between the stage of shock and the later stage of toxemia which results from the absorption of proteolytic products derived from the burned tissues or of bacterial origin. The question of a burn toxin, however, has been investigated. Robertson and Boyd reported that an alcoholic extract of burned skin but not of normal skin contained a toxic agent which caused death when injected into normal animals. The blood or red cells, but not the plasma, of burned animals also contained

the toxic agent. They came to the conclusion that a toxin formed in the burned tissues was absorbed into the blood stream and carried by the red cells. Vogt excised a burned area of skin from a guinea pig and transplanted to another, the first animal survived but the second died.

It is also known that the blood of burned patients contains a high concentration of histamine. However, no clear correlation in time between the Histamine concentration in the blood and the onset of shock has been found.

Shock producing exogenous toxins:

Extracts of Ascaris Suum (Ascaron): Intravenous injections of crude or purified of the round worm and hydatid cystic fluid cause a profound state of shock in dogs, cats, rabbits and guinea pigs which is undistinguishable from anaphylactic shock.

Mann and Essex demonstrated that in the dog the liver was chiefly responsible for the extreme hypotension since liverless dogs were not seriously affected by doses of ascaron that killed intact animals.

Thomas and Essex showed by making casts of the hepatic vasculature that the hepatic veins were thrown into such intense spasm that passage of blood from the liver was prevented. Although many drugs have been tried, none has been able to relieve the hepatic venous spasm caused by ascaron.

D.L. substance: This is a toxic substance discovered by Delezanne and Ledebt who found that cobra venom mixed and incubated with egg yolk produced a toxic substance that killed guinea pigs and rabbits. In this kind of shock, severe constriction of pulmonary vessels has been found.

2. *The theory of local fluid loss*:

This theory intends to explain traumatic shock entirely on the basis of the escape of blood or of plasma from the vessels at the site of the trauma.

Blalock showed that after bruising a limb by beating it with a hammer, the quantity of fluid which accumulates within the part, as estimated by comparing its weight with that of the sound limb, is sufficient to cause the fall in B.P. Some experiments revealed that as much as a third or a half of the total blood volume was calculated to have entered the traumatized area.

It is true that in many instances the quantity of circulating blood lost locally is sufficient to reduce the blood volume to the fatal level, but in other instances the fluid locally lost is not sufficient in amount to cause death. When death occurs with a fluid loss than which would prove fatal if lost by external hemorrhage, then another factor must be looked for.

Nathanson, Pope, etc. developed a technique allowing the collection of fluid from a muscle after ischemia was produced by the application of a tourniquet for some hours. They found that the muscle gained Na. and lost K. There was a loss of fluid into the leg locally from the body. The exudate which collected produced shock in one animal in four following injections.

3. *Shock of nervous origin*:

Since the failure of isolating a toxic substance to cause shock and the failure in some cases to explain the shock on the basis of local fluid loss, the role of the nervous system in shock has been investigated.

It is known that the sensory nerve impulses play a great part in production of primary shock. Whereas the role played by nervous system in secondary shock is rather complicated.

Experiments to determine the part played by the nervous system in shock fall into two classes:

A. The first consists in the attempt to produce shock by stimulation either traumatic or electrical, of different levels of the nervous system, central, peripheral as well as sympathetic system. And it was found that the only way to produce, by nerve stimulation, anything like shock, was by stimulation of the cardio-aortic or carotid sinus nerve over a period of from 6 to 8 hours. But this is something that is obviously not seen in ordinary trauma.

B. Second way of investigating the role of nervous system in shock is to avoid afferent impulses and see if this would effect the development of shock.

Wang of Columbia University has found that "animals survive muscle trauma with greater degree of blood reduction if the afferent impulses from the injured limb are interrupted by previous deafferentation.

O'Shaughnessy and Slome also found that blocking the nerve pathways by spinal anesthesia delayed or prevented the onset of shock in animals whose limbs had been traumatized.

As closing this chapter of discussion on the etiology of shock, it seems reasonable to make a statement that, while the theory of toxemia

remains wide open to further investigation, nervous impulses play an important role in production of secondary shock though blood loss into the injured tissues plays a part.

TREATMENT OF SHOCK

Success in treatment depends upon early recognition of shock. Failure is because of "two little or too late" treatment.

It was tried to emphasize in a previous chapter of the paper that the routine checking of the systolic B.P. is, in itself, of no value in determining the impending onset of shock. The principal early signs of impending shock are an increase in pulse and respiratory rate, a deterioration in the color of the musoca, a deterioration in the arteriolar-capillary rate and a softening of the pulse.

There are a few tests may help us in early recognition of shock. These will be mentioned here briefly.

The Tilting Test:

This test is based on the fact that upright position, in the presence of a reduction of blood volume, produces a stress on the circulatory system. Increase in pulse rate with a slight fall in systolic B.P. and moderate increase in the diastolic pressure occurs when the patient is brought from the supine to the semi-upright position.

The Tourniquet Test

The basis for this test is that in the presence of a decreased blood volume an artificial temporary reduction of the circulating blood volume by means of a tourniquet will result in a fall of the arterial B.P. The B.P. cuffs are applied to the upper parts of the thighs and the cuffs are inflated to a pressure just above the diastolic B.P. level. In a normal person changes in B.P. do not occur, but in a patient suffering from shock a fall in the arterial B.P. will occur.

Circulation Time

It has been found experimentally on dogs by Painter and Overman that changes in circulation time as determined by the fluorescein method within the first two hours following the traumatic procedure, is a simple yet sensitive early sign in the pattern of slowly developing shock. According to the authors, in many cases a true prognosis can be made on the basis of two consecutive determinations of the circulation time. In general it can be said that animals with impending shock in which the circulation time shows a gradual prolongation will die, whereas animals that survive show a slow improvement in the circulation time. It is generally accepted that a circulation time of over 30" by the fluoresein method indicates a grave prognosis. Two determinations of circulation time separated by an interval of one hour or longer should be done. And it would seem wise for practical purpose, to institute preventive therapy whenever the circulation time is found to be above the normal range.

Principles of Treatment

The main purpose of treatment in shock should be removal of causative factors (such as pain and fear in primary shock, stopping of bleeding in secondary shock) and restoration of normal physiology of circulatory system.

As physiologic basis for successful treatment of clinical shock two things are essential:

1. To restore the failing circulation
2. To restore the failing (anoxia) tissues.

The circulation can be restored, in most instances, by replacing the deficit in blood volume. A method of estimating whole blood volume in shock is of considerable value not only as an index of the circulating deficit, but also as a measure of the volume required in replacement therapy. This brings up an important question in treatment of shock. It should be remembered that while inadequate replacement of deficit in circulatory volume leads to failure in treatment and consequently puts patient in irreversible shock whereas over-replacement of circulatory deficit results in cardiac failure.

The usual method of blood volume determination in experimental shock is to determine plasma volume, by injecting Evan's blue dye into the circulation. After plasma volume determination by the diluting of the dye in the plasma, the total blood volume is estimated by using the following formula:

$$\text{Total blood volume} = \frac{\text{plasma volume} \times 100}{100 - (0.96 \times \text{hematocrit})}$$

0.96 is hematocrit correction factor.

As to the question how and with what should the deficit in the blood volume be replaced, it must be remembered that the purpose of replacement is not only to correct the reduction in blood volume and cardiac output, but to supply sufficient amount of oxygen to the tissues and by doing so to correct main pathology, namely oligemic anoxia. For this, it is obvious that the circulating blood must contain adequate amount of hemoglobin. Therefore, in hemorrhagic and traumatic shock where whole

blood loss is involved replacement should be made with whole blood, whereas in burn shock where circulatory deficit is mainly due to plasma loss, plasma should be given.

For practical purposes, saline infusion can be used for temporary replacement until blood or plasma is obtainable. Saline produces a much smaller and more transitory increase in blood volume. The temperature of the saline infusion is important: warm infusion stimulates the sino-auricular node and quickens the heart rate while a cold infusion has the opposite effect. A hypertonic saline infusion also exerts an intra vascular osmotic action, attracting water into the vessels from the tissue spaces.

Urinary output gives us a fairly good idea of prognosis and success of therapy. 20-50 cc. output per hour is a good sign.

The following table demonstrates hemodynamic response and increase in oxygen transport following treatment with albumin, blood and isotenic saline solution. 22 cases of shock shown in this table are all traumatic except 3 cases of burn shock which were treated in Bellevue Hospital.

This investigation indicates that the concentrated human albumin is an effective agent in the treatment of acute traumatic shock in man. The albumin injected into the circulation is largely retained, providing no further bleeding or exudation of plasma occurs. It is still remaining in the circulation at the end of 6 hours.

The albumin retained holds in the blood stream amounts of fluid approximately comparable to its osmotic activity. Thus, in the cases of Cournand, Noble and Breed, 1 gm. albumin retained resulted in an average increase of plasma volume of 23 cc. This fluid may have drawn into the blood from the tissues, or may have been simply retained, if additional crystalloid solution was also administered. No unfavorable side effects have been noted from the use of this preparation. The increase in plasma volume produced by the injection of albumin effects a marked improvement in the circulation. Specifically, all the primary changes associated with recovery from acute shock are observed: increases in right auricular pressure (venous return) in arterial pressure, and in cardiac output. Clinically, the patients are improved.

Comparison of the effects of albumin with those of rapid saline infusion have shown that saline produces a much smaller and more transitory increase in blood volume and the increase in cardiac output with saline infusion, while considerable, is not sustained.

In comparing the effects of albumin (or plasma) with those of whole blood: by giving albumin, the arterial oxygen transport is restored to normal only if the cardiac output is correspondingly increased above normal. Cournand's table shows this. But it should be remembered that there is a limit in the capacity of the heart to produce further compensatory output if hemorrhage continues. Eventually, the heart and circulation can no longer compensate and cardio-vascular failure will occur. In cases recovering from shock, this danger will be greater in the presence of any additional strain, such as operation, or if infection develops.

Gelatinoid products in treatment of shock:

Gelatin solutions are being used as substitute for plasma in replacement of circulatory deficit. These solutions are prepared from beef-bone collagen which is subjected to dialysis and clarification to free the solutions from pyrogenic substances. Purified gelatin solutions jell at low temperature. Shortly before administration, the solution should be brought to a fluid state by

Comparison of Average hemodynamic response and increase in O_2 transport following treatment with albumin, blood, isotonic solution from Noble, Breed, etc.

Type of Therapy	No. of Cases	Time of Measurement	Average Total blood volume cc per sq. M	% Average hematocrit	Average Auricular pressure MM H2O	Average Cardiac output litre per min. per sq. M.	Average O2 Consumption cc per minute per sq. M.	Arterial O2 transport	Amount of Material injected and retained	
Albumin 25 gm in 100cc	6	initial	1863 cc	36	0	2.27	154	298	injected	66 gm
		final	2207	26	plus 27	4.15	189	425	retained	42 gm
		differential	plus 344			plus 1.88	plus 35	plus 127	added crypt.	852 cc
Blood	10	initial	1734 cc	31	plus 10	1.76	137	201	infused	809 cc
		final	2261	33	plus 41	2.88	161	356	retained	88%
		differential	plus 527		plus 31	plus 1.12	plus 24	plus 155	added crypt.	921 cc
Saline	6	initial	2070	37	plus 37	2.81	154	379	infused	1644
		final	2234	32	plus 57	3.94	170	487		
		differential	plus 164		plus 20	plus 1.13	plus 16	plus 108		

warming to 37 c. Intra-venous administration of gelatinoid solutions have been shown to be effective in preventing the development of shock in traumatized dogs. In clinical shock, gelatinoid preparations have been found to produce a satisfactory colloidal osmotic effect as plasma. Approximately 80% of gelatin is excreted in urine within 48 hours. There is some doubt if gelatin is utilized by the body. But, no significant changes have been found in blood urea and amino acid levels.

Intra-arterial transfusion:

Among the reasons for giving blood by artery instead of by vein are the following:

1. Blood pressure is restored to normal leveis within a few minutes and the pressure is controllable.

2. Blood volume deficits are automatically corrected. That amount of blood will be taken into the circulation which is required to fill it at a given arterial pressurue.

3. When the heart and respiration have failed, blood given into an artery often brings about resuscitation.

It has been observed by Page of Cleveland clinic that when blood was transfused by artery, little more than half the amount of blood was required to restore arterial pressure than when blood was given by vein.

Page took serial x-ray photographs of a dog deeply in shock while it was receiving an arterial transfusion of radio-opaque material. They showed that the kidneys filled first, and immediately thereafter the coronary circulation.

The apparatus consisting merely of a pressure reservoir with a manomcter connected to the femoral or radial artery. If the need is urgent, an 18 gauge needle may be inserted, pointing toward the heart, or a glass cannula may be tied if time permits. Heparin solution is used to prevent coagulation in the cannula and tubing, but blood itself in the reservoir may be citrated unless very large amounts are to be given, when the use of heparin becomes more desirable. Care also must be taken to avoid air emboli.

According to Page, intra-arterial transfusion with this apparatus is a simple procedure. If the blood pressure is 30 mm Hg. or less, the pressure in the reservoir should be set 20 mm. higher, and blood allowed to flow in. The pressure is then raised 20 mm. gradually each time, until the systemic pressure is 100 mm. Hg. At this pressure, the patient's artery should be left open to the reservoir for a while to make it sure that the pressure will hold.

Arterial transfusions have greater value in thoracic surgery. The mortality rate from injuries of the mediastinal vessels is high. Though the hemorrhage may be surgically controlled, death may result from loss of blood and shock. In this case, intra-aortic transfusions have proved to be of considerable value in combating shock. Oxygenated blood is more effective if given by intraaortic method, thus, reducing anoxemia as well as replacing circulatory blood volume.

Supplementary treatment to transfusions:

Levine and his co-workers have emphasized the need to consider hemorrhagic shock treatment from an anti-acidotic point of view. In their animals, following 2-3 hours of serial bleeding and its consequent decline of B.P., a severe acidosis developed which remained uncorrected after the returns of all withdrawn blood. Of their animals, 75% entered the irreversible shock state and died. When acidiosis was corrected by supplemented administration of alkalinizing agents along with the reinfusions of withdrawn blood, the transition from impending to irreversible shock during the post-reinfusion period was, in many cases, permanently arrested.

Acidosis develops during the hypotension period. The transition from impending to irreversible shock occurs during the 90 minute hypotension period rather than in the post-reinfusion period. It seems worthy, therefore, to determine whether, by preventing acidosis from developing during the hypotension period, it might not be possible to prevent the transition from impending to irreversible shock during tne period of hypotension.

Wiggers and Ingraham have published the results of their experiments with alkalinizing agents in teratment of hemorrhagic shock in dogs.

The table on the following page shows the results.

Series	Recov.	died	% mort.
Control (untreated)	3	10	77%
Na Bicarbonate or Na lactate supplemented to re-infusion of withdrawn blood	3	10	77%
Continuous NA Lactate infusion during hypotension period	1	5	83%
Continuous Na Bicarbonate during hypotension period	7	6	47%

In this experiment Na Lactate given 0.87 gm. per kilogram and Na Bicarbonate 0.65 gm. per kilogram of body weight of dogs. Only minimum amount of water used to dissolve the alkalies.

The above table shows that while supplementation of alkalinizing agents to retransfusion did not change the mortality rate in irreversible stage of shock in comparison with those of controls, continuous NA Bicarbonate infusion during the hypotension period reduced the mortality rate to 47%. In contrast to this beneficial action of Na Bicarbonate, administration of Na Lactate did not reduce the mortality rate at all in their experiments. The authors are convinced that Na Lactate is neither effective anti-acidotic agent nor useful in the treatment of severe hemorrhagic-hypotensive conditions which may progress to irreversible shock if not combated. The hypothesis is that the anoxia of hemorrhage may decrease the ability of the liver to metabolize lactic and amino acids, attributing this failure to a substance present in tissues which becomes active under anorobic conditions.

Following table shows effect of alkalinizing agents to the plasma CO2 volume of shocked dogs.

Series	*No. of Dogs*	*Plasma CO_2 volume*		
		cont.	90" hypo-	post-
Na Lactate fatalities	5	48.3	28.3	32.3
Na Bicarbonate fatalities	4	45.8	40.6	38.8
Na Bicarbonate recoveries	6	44.0	55.3	51.7

Value of Ascorbic acid in supplementation of transfusions

As it is known, Vitamin C is reported to raise the natural resistance of guiena pigs, monkeys and man, and its requirements are greatly increased during infection, in wound healing and probably under all conditions of stress. Its use in the treatment of traumatic injuries as well as in post-operative shock has been strongly advocated. In the laboratory, the survival time of the cats, bled to 50% of their original blood volume, has been prolonged by the I.V. administration of 1 gm. ascorbic acid. De Pasqualini's following table shows his experiments with Vitamin C:

	No. of animals	*died of shock*	*survived*
Treated with Vitamin C	18	1	17
Controls	17	15	2

De Pasqualini administered ascorbic acid in considerably large doses of 200 mgm. intraperitoneally 15 minutes prior to bleeding except 5 animals which received 100 mgm. intra-arterially via carotid artery 5 minutes previous to bleeding. The controls were treated in the same way, the vitamins being replaced by physiologic saline.

Ungar greatly reduced the mortality rate from traumatic shock in guinea pigs, rats and mice, the minimal effective dose 100 mgm. per kilo. According to Unger the effect was not due to vitamin C since the oxidized preparations gave the same results.

Up to this part of discussion, replacement of blood volume deficit and supplementation to replacement therapy was discussed. Combating anoxia is an important part of the therapy in shock. The O_2 tent is useful in two ways, by reducing respiratory efforts and giving ready access to oxygen to the red cells. Efforts have been made experimentally to transport O_2 in the plasma, but without any success so far as combating anoxia is concerned. The other way of increasing the O_2 carrying capacity of the blood is by restoring the blood volume with fluids. Restoration of volume alone, even though it dilutes the red cell concentration, by increasing blood pressure accelerates the red cell flow and thus increases their efficiency. But it is obvious that if great reduction in red cells has taken place, O_2 inhalation and mere replacement of circulatory deficit would not be of a great value unless deficit in red cells replaced. In this case transfusion of oxygenated whole blood should be the treatment of choice.

Morphine in treatment of shock:

Morphine has been widely used in shock. Attention has been called against using morphine in shock.

Gregersen showed that the I.V. injection of 2 mgm. Morphine Sulfate caused, in normal dogs, a sharp drop in the respiratory rate and volume, in 0_2 consumption, and in B.P. and heart rate. It is interesting to note that although the cardiac output was depressed, the calculated total peripheral resistance increased. When the same dose of morphine was given to animals in hemorrhagic shock, there was a temporary increase in the 0_2, arterial CO_2 and cardiac output. But these evidences of improvement in the circulation did not alter the eventual outcome or prolong the survival time. In dogs in severe traumatic shock, Gregersen found that the morphine only exaggerated the circulatory disturbances.

Gregersen calls attention to the fact that even small doses of morphine may have a considerable effect on a failing circulation.

Conclusion:

In this paper it has been attempted to summarize the literature on physiological pathology of acute circulatory failure. Pathogenesis and etiology, mainly toxemia and local fluid loss theories and nervous factoris in development of shock; and physiological basis of therapy including restoration of circulation and measures to combat anoxia were discussed.

As concluding my words, I would like to express my appreciation to Drs. Frederick Lesemann and Louis Hirsch, and Miss Mabel Lucey, the librarian, for their valuable suggestions and kind assistance in helping me prepare this paper.

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PHOENIX *Clinical* CLUB

MASSACHUSETTS GENERAL HOSPITAL CASE NO. 29421

The Case History in this discussion is selected from the Case Records of the Massachusetts General Hospital, and reprinted from the New England Journal of Medicine. The discussant under Differential Diagnosis is a member of the staff of the Massachusetts General Hospital. The other discussants are members of the Phoenix Clinical Club.

A forty-one-year-old night watchman was admitted to the hospital because of intermittent gas pains of ten years' duration.

The patient was apparently well until about ten years prior to entry, when he developed intermittent attacks of indigestion in which he suffered from epigastric gas pains and the sensation that his stomach was "tied up in knots." The pain occurred approximately half an hour after eating, or when he had gone three or more hours without eating, and lasted for about an hour. It was relieved by anything that would "break the gas" and produce gaseous eructations such as soda, milk or food. The attacks were sometimes precipitated by cabbage, pork and fried foods. Vomiting of undigested food, especially fried foods, sometimes gave relief. The vomitus was never bloody, nor did it contain coffee-grounds material. The last attack of vomiting occurred six weeks before admission. Three years before admission, following x-ray examination at a community hospital, he was

placed on a strict ulcer regime, with prompt symptomatic relief as well as gain in weight. The diet, however was discontinued six months later and the symptoms recurred. Nine months prior to entry, while working in a dusty atmosphere, he had two or three attacks of vomiting and his symptoms increased in severity for two months, at which time he obtained another job, with some relief in his condition. In the three or four months before entry he experienced daily distress after almost every meal. There was anorexia and a weight loss of 15 pounds. He subsisted mainly on soups, milk and cream, crackers, tea and so forth. He became progressively weaker.

He had been constipated most of his life and had habitually taken various laxatives. There had been no back pain, heartburn, dizziness or fainting. He smoked one package of cigarettes daily and drank some beer and a little whisky. He had experienced considerable financial difficulties.

Physical examination showed a well-developed small, wiry, tense man with evidence of recent weight loss. There was no pallor. He was endentulous. The tongue was reddened and coated with coarse papillae. The heart and lungs were normal. The abdomen was scaphoid and soft. There was no tenderness, spasm or palpable masses. Peristalsis was active. Rectal examination revealed a small, firm, nontender prostate. Considerable tenderness was elicited superiorly and on the left, where a questionable soft mass was palpated.

The blood pressure was 125 systolic, 80 diastolic. The temperature was 98.6°F., the pulse 76, and the respirations 20.

The blood showed a red-cell count of 4,300,000, with a hemoglobin of 14 gm. The white-cell count was 6800, with 63 per cent neutrophils. The urine was normal. The stools were guaiac negative on eight occasions but gave a 4+ test on one occasion. The blood Hinton test was negative. The nonprotein nitrogen was 20 mg. per 100 cc. The blood protein was 5.6 gm. per 100 c.c., the carbon dioxide combining power 21 millimols per liter, the chloride 95.9 millieguiv. per liter and the blood sugar 74 mg. per 100 cc. Gastric analysis showed no free acid before and half an hour after histamine injection; the values for total acidity were 5 and 18 units respectively. Both aspirations gave a ++ guaiac test.

X-ray examination showed a normal esophagus. Just below the cardia there was an ulcer crater measuring 1 by 1 cm., with a rigid, soft-tissue mass surrounding it. This filling defect measured 4 cm. in length. The remainder of the stomach and duodenum was normal.

The patient was placed on a gastric diet with tincture of belladonna, 15 drops, and phenobarbital 2 gr., three times a day. His condition improved. Gastroscopic examination eight days after entry showed a normal antrum and pylorus and an increased reddening of the body of the stomach in the upper part, with a few streaks of bright-red blood. There was a marked verrucous, cobble-stone appearance in the upper 4 or 5 cm. near the cardia; no ulcer crater could be demonstrated. Following gastroscopy, the epigastric symptoms recurred but were relieved by Creamalin 45 cc. every two hours. A gastric analysis on the fifteenth day showed 25 units of free acid and a total acid of 35 units half an hour after histamine injection. X-ray examination after one month on the medical regime showed the ulcer crater to be smaller than it was formerly, but the crater was surrounded by what appeared to be a polypoid mass extending along the lesser curvature for about 8 cm. The lesser curvature was rigid in this area.

An abdominal exploration was performed six days later.

H. L. FRANKLIN, M.D.

After mulling over this case for a considerable time, and perusing a treatise titled "Disease of the Digestive System," and a few other pertinent pieces of literature bearing upon the same subject, I have come to the conclusion that the correct diagnosis is so obvious that I am going to play a one-shot and if I am wrong, or very wrong, I am going to resign from this club and go fishing. I shall, therefore, say right off that our patient was suffering from that broad and general inclusive term known as dyspepsia. Although we have good evidence that there is pathology in the stomach and perhaps in sufficient quantity to account for all of the symptoms, it is perhaps pertinent to say that without the benefit of x-ray and gastroscopy we might be somewhat in the dark as to whether it originated in the stomach or outside. One author states that for every six cases of dyspepsia five have their origin outside of the stomach. To name a few; tuberculosis, heart disease, anemia, nepheritis, cirrhosis of the liver, neuroses, dis-

ease of other parts of the intesinal tract. We have, however, positive evidence of some stomach pathology three years prior to admission, though his stomach trouble had existed for seven years prior to that. At this time, after an X-ray examination, he was placed on an ulcer diet and improved. I presume some evidence of ulcer was found at that time. Bloomfield states that if we can rule out duodenal ulcer, which I think we have done, then the three most common diseases of the stomach are gastritis, both acute and chronic, gastric ulcer, and carcinoma. The incidence about as follows: gastric ulcer 9, carcinoma 7, gastritis 45. There is considerable evidence that gastric ulcer was present, indeed this diagnosis was made three years before entry and a short while before operation, both by x-ray and clinical symptoms, and I think this diagnosis would have stood had they not later, upon a gastroscopic examination been unable to find an ulcer, but instead found an increased reddening of the upper part of the stomach with a few streaks of bright red blood, with a verrucous cobble-stone appearance in the upper part of the cardia. One month after this report and after an ulcer regime an x-ray report shows an ulcer crater, but smaller than the previous examination, and surrounded by what appeared to be a polypoid mass extending along the lessor curvature for 8 cm., and the stomach wall in this area was rigid. This is somewhat confusing since all x-ray reports show a crater, and the gastroscopic does not find it. We shall have to hear the surgeon's or pathologist's report to settle this point. Templeton and Schindler in a study of 44 cases of ulcer found that only 33 were demonstrated with both methods. Four were seen with the scope and not the x-ray, and seven were seen with the x-ray and not through the scope. Perhaps it is this discrepancy that caused this case to be presented.

From an evaluation of the symptoms and findings and on a basis of statistical chances, I am going to assume that the diagnosis is between chronic gastritis, and gastric ulcer, perhaps associated with the gastritis, and cancer.

Syphilis is presumably ruled out by the negative Hinton, and tuberculosis, while it cannot be ruled out, to consider it would be far-fetched. I am assuming that by the record there is no evidence of t.b. elsewhere in the body and the G.I. tract otherwise is normal. The mention of a possible tender mass high up on the left side upon rectal examination is probably a herring of some sort

Schindler states that in chronic gastritis there is an infiltration and proliferation of the gastric mucosa leading to a thickening. It comprises about 41% of all cases of chronic gastritis. The etiology is unknown. It cannot be recognized grossly in the postmortem specimen except in cases of tumor-simulating proliferation of the mucosa. Microscopically three different forms may be distinguished, although grossly at gastroscopic examination the same picture is observed with all of them, namely; 1. hypertrophic interstitial gastritis, 2. hypertrophic proliferative pastritis, 3. hypertrophic glandular gastritis.

1. In hypertrophic interstitial gastritis may be seen dense lymphocytic infiltration between the long body glands, usually together with enlarged lymph follicles which have no sharp limits.

2. In hypertrophic proliferative gastritis the lymphitic structures of the glands are unaltered, but on top of them there is a grotesque proliferation of the surface epithelium which grows to form irregular large nodes, which double the thickness of the mucosa.

3. In hypertrophic glandular gastritis inflammatory processes are relatively few, but there is a tremendous over-growth of the glandular apparatus, which may treble the thickness of the mucosa.

In (2) and (3) tumor formation simulating carcinoma may be observed. The gross appearance is best studied with the gastroscope. In healthy arults the mucosa is glistening and smooth, while in patients with hypertrophic gastritis it has a dull, velvety, loose, spongelike appearance. The area involved later becomes nodular with a typical "cobble-stone" surface. The changes are found most frequently in the body, although sometimes they may be seen in the antrum. Inflammatory, small and large mucosal hemorrhages are frequent. From time to time small grey or yellow ulcerations develop. The symptoms are chiefly gastric. Severe ulcer-like pains are present, sometimes they may not be relieved by administration of milk or alkali. The patient states that he has always had a weak stomach, has had to be careful about his food, and vomiting rarely occurs, profuse hemorrhages occur and may even have a fatal outcome. The physical examination and tests give essentially

negative results, although occult blood may be found in the stools.

This description is consistent with the gastroscopic description in our case and in a like manner the symptoms of indigestion over a period of ten years are consistent with a chronic gastritis.

There is no way that I know to say that we are not dealing with a cancer superimposed on an old gastritis or ulcer. The weight of evidence is that perhaps cancer is a little more likely to develop in an area of gastritis or ulceration than in a healthy stomach, certainly if it is cancer, it is a late comer. The reference to the gastric analyses furnishes no evidence one way or the other, due to the variation in the ability of individuals to secrete acid and the extent of the lesion and its location.

However, some free acid was recovered after the last histamine test. This might be considered a point against cancer. He had lost some weight, there was a mild anemia, all of which could have been due to poor diet, rather than cancer. It is worth mentioning, I believe, that although this patient had had stomach distress of all sorts for a period of ten years, and was under observation for three years with a probable diagnosis of gastric ulcer, he was treated medically. It was only after the polypoid mass was discovered that an exploratory operation was performed, certainly they suspected that a cancer had developed in that area.

I am just as unable to make a correct diagnosis in this case as it was to the eminent medical men at the bedside and in the laboratories. I think they were thinking of gastric ulcer with a cancer superimposed, or chronic hypertrophic gastritis. The x-ray shows an ulcer, the gastroscopist does not find an ulcer but what seems to be a chronic gastritis.

I am going to guess that he did have a chronic hypertrophic gastritis with nodular or polyp formation, perhaps a healed or active ulcer. Now, I hope that what I have written here is not too fuzzy. Here's to more and better fishing until we meet, again, probably.

Read before the Phoenix Clinical Club, May 14, 1951.

DIFFERENTIAL DIAGNOSIS

Dr. William B. Breed: It seems to me that there are two possibilities to be considered. Either this lesion was a benign one throughout its course or it started as a peptic ulcer, then degenerated and became malignant. The history certainly is suggestive of the latter supposition. You will note that the early story is indicative of peptic ulcer with periodic pyloric obstruction and relief of symptoms on an ulcer regime, as well as recurrence of symptoms when the regime was discontinued.

The dusty atmosphere of his new job can be disregarded. I have no thoughts about that.

Two or three months prior to entry he began to have continual discomfort directly after eating, with anorexia and loss of weight but no typical symptoms of ulcer. Up to that point this could well have been a benign ulcer near the cardia that had degenerated and had become malignant. Gastroscopy possibly confirmed the nature of the process: the upper part of the stomach wall was verrucous and cobblestone in appearance.

Dr. Edward B. Benedict: That does not mean malignant disease. That means gastritis.

Dr. Breed: I am glad you are here, Dr. Benedict The record states, "a marked verrucous, cobblestone appearance." There was no mass. Will you describe it as you remember it?

Dr. Benedict: A verrucous and cobblestone appearance may mean chronic hypertrophic gastritis.

Dr. Breed: In a localized area?

Dr. Benedict: Sometimes localized, sometimes generalized. This was fairly well localized.

Dr. Breed: You introduce the idea here at once that this lesion was benign. Let us go ahead and see wheather we can put that together with the second examination by x-ray, which described a polypoid mass extending along the lesser curvature, which a rigid musoca.

In passing, I should say that one has to consider lymphoma of the stomach in any condition like this. However, I am willing to conclude that if this was a polypoid mass it probably was not due to lymphoma. Do you ever see polyps in lymphoma, Dr. Benedict?

Dr. Benedict: Not discrete polyps.

Dr. Breed: You saw no polypoid mass?

Dr. Benedict: No, but I could not see the ulcer. It was in a part of the stomach that is difficult to visualize.

Dr. Breed: No polyp was seen on the first x-ray examination. We might see both sets of film.

Dr. Milford Schulz: Here are the films made at the time of admission, and there is no gain saying the fact that there is an ulcer with what appears to be a mass of soft tissue about it.

In addition you can see an irregular soft-tissue mass extending into the cardia.

Dr. Breed: What does that mean to you? Is this soft-tissue infiltration?

Dr. Schulz: By all the rules it should be a carcinoma.

Here are the films made after a month of treatment. The ulcer is somewhat smaller. You still see all this thickened verrucous soft tissue exending into the air-filled and barium-filled portion of the stomach. It is true that there are quite prominent mucosal folds throughout the stomach; in a recent similar case, however, in which a diagnosis of cancer was made, the condition at operation proved to be gastritis and not carcinoma.

Dr. Breed: This is not that case by any chance

Dr. Schulz: No.

Dr. Breed: Kindly show me the polyp.

Dr. Schulz: There is no true polyp, but there are numerous soft-tissue masses extending into the gas bubble of the stomach and displacing the barium. Here is the defect in the stomach in which the ulcer lay. By all the rules that should be a neoplasm.

Dr. Breed: I am going to stick to the rules, because it is a fairly straightforward history and I see no reason for trying to be too smart. The patient had an ulcer for ten years and then developed a cancer at the side of the ulcer.

Dr. Benjamin Castleman: Is there any other comment?

Dr. J. H. Means: I think it could be a leomyoma. I am not offering that as one of the possibilities, but it seems to me that I recall that they are apt to run a more or less benign course for some years and then become increasingly malignant.

Dr. Castleman: They usually give a long history of bleeding and become larger extremely slowly. A few of them do become malignant, however.

Dr. Means: What about other tumors of the stomach, such as fibroma?

Dr. Castleman: I do not believe that an accurate differential diagnosis of the various intramural tumors—fibroma, neurofibroma and leiomyoma—can be made clinically or by x-ray, or even microscopically in some cases.

Dr. Means: I discussed that point with Dr. George W. Holmes, some years ago. He claimed that when they were smooth and round it was one thing, and when lobulated it was another. How about the significance of these differences? Does the lobulation mean anything?

Dr. Castleman: A definite lobulation is perhaps more in favor of a neurofibroma, but all these tumors tend to be well circumscribed and round. They often have a central ulceration

Dr. Schulz: An intramural tumor is usually quite characteristic in appearance roentgenologically. It displaces or smooths out the mucosa rather than showing soft-tissue masses extending into the lumen of the stomach.

Dr. Breed: I shall have to add that he had gastritis as well as cancer.

Dr. Benedict: I think the ten-year history is in favor of a benign lesion.

Dr. Breed: Such as?

Dr. Benedict: Benign ulcer. Of course that brings up the question, Do benign ulcers ever become malignant? A lot of people think that they never do.

Dr. Castleman: I was about to take issue with Dr. Breed's statement.

Dr. Breed: I have two against me.

Dr. Castleman: We are certain that an ulcer remains an ulcer and does not degenerate into a carcinoma I believe that there are a few cases with definite ulceration in the stomach, proved roentgenologically, that ten years later develop carcinoma in the same location—that is, in the ulcer. If one checks some of these histories of long-standing ulcer with carcinomatous degeneration one often discovers that the ulcer was in the duodenum and not in the stomach, and things of that sort. It is true that carcinoma can remain in the precancerous state,—carcinoma in situ,—limited to the mucosa, without invasion over a long period of time. We have seen several examples of this condition*. Furthermore, precancerous lesions have been known to exist for six or seven years in the cervix. These carcinomas in situ may ulcerate; they are, however, ulcerating carcinomas, rather than carcinomas developing in benign ulcers.

Dr. Breed: Along that line, it did occur to me when I was studying this case that the patient might have had a duodenal ulcer and that this was a new malignant lesion. I am willing to go back to that idea. Since the pathologist

*Mallory, T. B. Carcinoma in situ of stomach and its bearing on histogenesis of malignant ulcers. Arch. Path 30:348-362, 1940.

insists that ulcers do not degenerate, I shall probably have to agree; but I still think that the lesion was malignant.

Dr. Means: The picture could fit with carcinoma in situ, could it not?

Dr. Castleman: It could, although ten years is a long time for carcinoma in situ; most of them are under five years in duration.

Dr. Ronald C. Sniffen: This area of the stomach is rather unusual for carcinoma in situ, is it not?

Dr. Castleman: Yes; most of the lesions have been in the prepyloric region.

Dr. Breed: The patient may have had a duodenal ulcer for ten years and then developed cancer of the stomach in the cardia. I am willing to accept that.

CLINICAL DIAGNOSIS

Carcinoma of stomach.

DR. BREED'S DIAGNOSIS

Carcinoma of stomach.
Duodenal ulcer?
Chronic gastritis.

ANATOMICAL DIAGNOSIS

Acute and chronic phlegmonous gastritis, with gastric erosions and ulcerations.

PATHOLOGICAL DISCUSSION

Dr. Castleman: The surgeon's operative notes state that he was able to feel two ulcers, one close to the cardia and one 5 or 6 cm. below that. He thought that the lesion was probably benign, but since he was not absolutely sure, and since the ulcers were high in the cardia, he believed that the patient would do better by having a resection.

When the stomach was opened, we found innumerable ulcers. Some were old, measuring 2 or 3 mm. in diameter, with a greenish-fibrinoid base, the result of necrosis. Between the ulcers the mucosa was markedly edematous and red and the rugae were prominent. This appearance reminded me of that of ulcerative colitis, with bridges between the ulcers. It might be called a phlegmonous gastritis.

Microscopic sections showed an acute and chronic inflammatory reaction throughout the whole wall, with necrosis of the musoca and the formation of erosions and deep ulcers. We were unable to find a chronic ulcer that the patient might have had for ten years. It may have been in the duodenum, or more recent disease may have covered it.

Dr. Benedict: Were they true peptic ulcers, or erosions?

Dr. Castleman: Both were present.

Dr. Benedict: How do you distinguish between them?

Dr. Castleman: One speaks of an erosion if the destruction extends to the muscularis mucosa; if it goes beyond that, it is an ulcer. The etiology is the same.

There was no evidence of malignant disease.

NEWS ITEMS

RECENT MEDICAL GRADUATES SELECTIVE SERVICE

It has come to the attention of the National Advisory Committee that some individuals who may be in either Priority I, II, III or IV, and who obtained their professional degree this June have failed to register as required under Public Law 779. If they are under 26 years of age they are, of course, regular registrants, but should also register as special registrants. It is imperative that these individuals register at once. (Of course, if they are in the active Reserve it is not necessary for them to register.)

1952 FELLOWSHIP DUES DISCONTINUED

The Board of Trustees of the American Medical Association at a meeting held in headquarters recently, decided there would be no Fellowship dues for 1952. The dues, the Board feit, are no longer required since A.M.A. members are now paying membership dues and, furthermore, the Fellowship dues requirements were too confusing to members as a whole.

Fellowship dues of $5.00 for 1951 are still payable.

THE Secretary's MESSAGE

THE ARIZONA MEDICAL ASSOCIATION, INC.

Many times the question has been asked: "Of what advantage or benefit is membership in the Arizona (State) Medical Association?"

This article is dedicated in an endeavor to answer this oft-repeated query.

First, what is or what comprises the State Medical Association? In case some of you do not know, your State Association is a constituent body of the American Medical Association. In this capacity it acts as an intermediary between the national organization level and the local component County Medical Societies in carrying out the policies and purposes of the parent organization. As you know, each component County Medical Society operates under charter and at the pleasure of the State Association, and therefore it is essential that there be a very close and cooperative relationship between these two levels in order that the activities of each may be ever closely coordinated.

The pattern of organizational structure in your State Association parallels that of AMA, comprising a House of Delegates, consisting of representation from among the membership of the County Medical Societies, acting as the official governing body. It elects the Officers and Council, which group functions as the administrative and financial operational medium. This body in turn appoints membership to its Professional and Public Relations Boards, in addition to seven standing committees, namely: History & Obituaries, Industrial Relations, Legislation, Medical Defense, Medical Economics, Publishing, and Scientific Assembly. As occasion arises special committees are also appointed, presently including Civilian Defense, Constitution & By-Laws, Grievance, and Procurement & Assignment. This latter group (P&A), in addition to dental and veterinarian groups, also serves as the Arizona Advisory Committee to the (National) Selective Service System. We will not go into detail as to the scope of operation of each of these boards and Committees. Suffice to say that their activities, as indicative of their respective titles, are varied and extensive within their individual fields. It would be amiss, however, not to mention here and pay tribute to those members, officials of your organization, who give so unstintingly of their time and energy without remuneration or personal aggrandizement in the interest of the medical profession. They are the workers and to them should go our everlasting appreciation and gratitude.

It is obvious that within so large a national organization reaching into every corner of the land, it is confronted almost daily with problems, both professional and administrative, requiring the most deliberate study and solution. Your State Association works in close harmony with AMA in its efforts to cope with such problems as your local representative and spokesman. Likewise, on the state level, it institutes procedures and initiates actions of direct local concern. Medical defense against suits of alleged malpractice and matters legislative consume considerable time and preparation, to safeguard your interests, which alone would adequately merit continuing membership in and active support of your State Medical Association. Medical Economics, Industrial, Professional and Public Relations each are chapters deserving of recognition within themselves and require constant vigilance and attendance by their respective boards and/or committees. Possibly no other public relations project is contributing so much toward improved physician-Patient relations than the operations of your state and local (Maricopa and Pima) Grievance Committees. This is being accomplished through your cooperation and participation in investigations. Scientific Assembly may not be widely understood, but this Committee is responsible for the presentation of your Annual Meeting. This activity in itself is becoming big business and demands constant attention and planning between meetings. Technical exhibits and scientific sessions require much thought and able supervision. The outstanding scientific program presentations and continuing success of this meeting reflects the effort put forth by this group.

Your State Association is representative of the medical profession. Its organization—your organization—is ever alert and ready to serve. It is deserving of your confidence and support.

Editorial

ARIZONA MEDICINE

Journal of

ARIZONA MEDICAL ASSOCIATION, INC.

VOL. 8 DECEMBER, 1951 NO. 12

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The Editor sincerely solicits contributions of scientific articles for publication in ARIZONA MEDICINE. All such contributions are greatly appreciated. All will be given equal consideration.

Certain general rules must be followed, however, and the Editor therefore respectfully submits the following suggestions to authors and contributors:

1. Follow the general rules of good English, especially with regard to construction, diction, spelling, and punctuation.
2. Be guided by the general rules of medical writing as followed by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. (See MEDICAL WRITING by Morris Fishbein.)
3. Be brief, even while being thorough and complete. Avoid unnecessary words. Try to limit the article to 1500 words.
4. Read and re-read the manuscript several times to correct it, especially for spelling and punctuation.
5. Submit manuscript typewritten and double-spaced.
6. Articles for publication should have been read before a controversial body, e.g., a hospital staff meeting, or a county medical society meeting.

The Editor is always ready, willing, and happy to help in any way possible.

PREPARATION OF THE AGED PERSON FOR SURGICAL OPERATION

It has been thought for a long time that the principles of surgery are altered by the age of the patient. Thus we have text books on Pediatric Surgery and there are numerous articles on the surgery of the aged. Nevertheless, the primary surgical principles are similar or identical in various age groups although the application of these principles to the problems which specific patients presents may require modification because of the factor of age. It is not always possible to draw a sharp line and state that every patient past sixty is aged, for many patients past this age are in reality in a better state of health from the standpoint of the aging process than are patients in the latter forties or fifties.

The processes of aging are not uniformly progressive in all people, nor are the criteria of the aging process now so clearly defined that they are readily established in their entirely. It has been stated repeatedly that we are as old as our cardiovascular systems, but the problem is not nearly so simple as that. The cardiovascular system is not the only one affected by the aging process.

Partial impairment of the functional capacity of certain viscera may occur at any period of life, due to preexisting systemic disease or perhaps excessive or protracted intake of alcohol, excessive smoking or even persistent overeating. It may result from prolonged exposure to certain noxious agents, as in industry, or from accumulated fatigue or any one of the many other sources of injury.

It is, therefore, impossible to generalize on the problems which the patient past middle age presents from the surugical view, for the conditions which have surrounded the individual during life and the diseases to which he may have been subjected vary greatly in extent. With older patients, individualization is far more essential than with younger adults or children. There are, however, certain physiological changes which the processes of aging are known to bring about more or less uniformly in all individuals. These, without a doubut, create some additional hazards to surgical procedures and should therefore lead to certain modifications in surgical practice. While the surgical principles may remain the same, expediency requires their modification, in one direction or another, in order that the morbidity and mortality of operations upon the elderly be reduced to a minimum.

The surprising thing is that every surugeon who has been interested in the surgery of the

aged has come to recognize that, properly protected, the risk to the senile patient is not nearly as great as it is commonly believed, even for extensive operations. Realization that the special hazards are not insurmountable has led to gradual extension of the radical surgery in certain diseases to those who previously were denied possible benefit. In order that this be further extended, it is important that certain physiological facts be more widely understood.

It is generally believed that the aging process is accompanied by a decrease in the volume of the circuluating blood. It would seem improbable for the plasma volume to remain constant when, as a result of the changes of senescence the blood vessels become less elastic. Wiggers and other investigators have repeatedly called attention to the fact that the distensibility of our blood vessels diminishes with age. In addition to the sclerotic and atheromatous lesions so common in senescents, other more subtle changes occur.

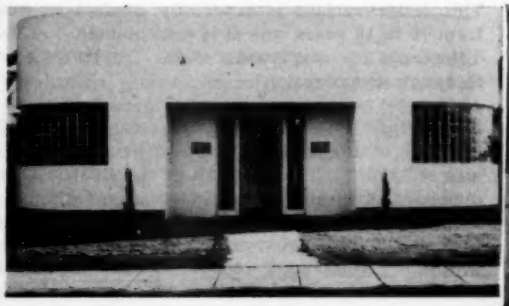
The inability of the vessels of the aged to adjust rapidly to changing conditions of blood volume creates one of the major hazards of prolonged anesthesia and extensive operation, especially if the latter is associated with considerable trauma. There are now a number of factors which must be considered.

The very marked and nearly instantaneous manner in which vasodilatation and vasoconstriction can occur in normal individuals provides an effectie protective mechanism of paramount importance where rapid changes in the size of the vascular bed are necessary. Large amounts of sodium chloride solution, plasma, serum or blood may be injected into an individual with a normal cardiovasculuar system without the slight danger. In the aged, however, very much smaller amounts may produce cardiovascular incompetency because the vascular system is no longer easily distensible. In a similar manner the loss of even a considerable amount of the blood or plasma volumue may be well tolerated by an individual with normal vascular response and a normal heart, because of rapid vasoconstriction and the simultaneous increase in the heart rate lead to maintenance of a normal minute cardiac output. In such circumstances vasoconstriction provides an important protective mechanism against cardiovascular incompetency. On the other hand, where the myocardium is not so strong and vasoconstriction not so easily accomplished, a much smaller loss of circulating blood volume may be attended by the most serious of consequences.

In the preparation of an aged individual for surgical operation, a survey of the cardiovascular system is, of course, in order. Except for Stokes-Adams attacks, and the discomfort produced by abnormal cardiac rhythms, the heart symptoms that an aging person complains of are the manifestations of heart failure. Dyspnea produced by exertion considered inadequately by the patient, or breathlessness prolonged beyond the ordinary recovery period should be suspected as of cardiac origin, as should any type of chest or arm discomfort having a repeated relationship to exertion or emotion. In general it may be said that there is no way to determine abnormal cardiovascular aging beyond the discovery of a history of angina pectoris, or its painless equivalents, except by finding definite cardiac enlargement, persistent hypertension, calcific aortic stenosis, a loud constant apical svstolic murmur, clearly abnormal cardiac rhythms, signs of congestive failure, or typical electrocardiographic patterns of conduction defects or myocardial ischemia. Frequently physicians ask: "Will this patient's heart withstand an operation?" This indicates a belief widely held that anesthesia and operation impose upon the heart burdens that must be seriously considered in deciding for or against an operatio nupon the patient with heart disease. The basis upon which this belief rests is that during operations there may be observed disorder of the heart's rhythm, rapid heart action, thready pulse, low blood pressure, cyanosis and disturbances of respiration. It is true that most of these are circulatory manifestations, but they do not indicate incompetency of the heart. As Marvin of Yale pointed out many years ago, for the purpose of anesthesia and operation, the heart that is damaged but is carrying on an adequate circulation under normal conditions at life is equivalent to the normal heart. In other words no matter what the heart size may be, no matter what thrills or murmurs may be present over the precordium, no matter how far or in what directions these murmurs may be transmitted, if the patient has been leading a life involving moderate activity without symptoms the heart may be regarded as equivalent to a normal one and it may be safely assumed that it will behave properly during anesthesia

and operation. There are certain exceptions, however, that must be mentioned. Syphilitic heart disease with aortic insufficiency, complete heart block, coronary artery disease including bundle branch block offers certain hazards as patients with these conditions may suddenly die.

Many of these aged individuals who are suffering from malnutrition and chronic debilty and osterporosis and nitrogen balance is disturbed. Testosterone and estradiol aid in the addition of protein to the tissues of the body. They promote the formation of new protoplasm. Obviously a hormone cannot substitute for adequate supplies of food includuinug a proper share of proteins, but there is evidence that the sex steriods strongly influence the manner in which foods will be utilized. It was shown by Albright that nitrogen balance was improved by administering testosterone to a patient who had been receiving inadequate proteins; the further destruction of the patient's own tissues, as a source of fuel, was "inhibited." In chronic debilitated states such as rheumatoid arthritis, "tissue anabolism was reinitiated" by androgen. In the practical application of this medication, one takes advantage of the fact that androgens and estrogens act as synergists in protein synthesis, but antagonize each other's actions on the reproductive tract and sexuel characteristics when a suitable ratio of dosage is administered. The ratio may vary from 20:1 to 50:1. The two hormones are administered in a single injection of about 1 cc. and are given 2 or 3 times weekly. For example in the ratio of 20:1 testosterone is given 0.8 cc. of the 25 mg./cc. combined with estradiol benzoate 0.3 cc of the 3.33 mg./cc. dosage. The ratio may be changed depending upon the patient's response. In the preoperative treatment of patients with osteoporosis, these sex hormones are of definite value, since it is now recognized that osteoporosis is primarily a disease of the protein matrix of the bone The soft-tissue in which calcium is laid down deteriorates then the calcium is released. It has been shown that testosterone or estradil, or the two given in combination, will reverse the protein losses and permit recalcification to take place. In summary then it can be said that the aged person should be prepared carefully for surgery and the complete evaluation of the cardiovascular system should be carried out and congestive failure should be remedied. If there is any evidence of prostatic obstruction, this should be relieved. Chronic debilitated conditions the patient and those suffering from malnutrition as well as osteoporosis should be treated with the sex gland.



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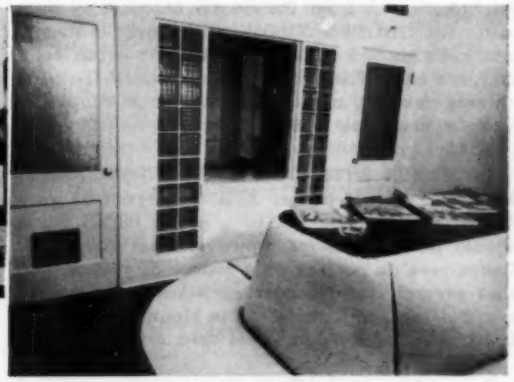

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TOPICS OF *Current Medical* INTEREST

RX, DX, AND DRS.

By GUILLERMO OSLER, M.D.

This 'Osler' business can become even more complicated. . . . A Baltimore friend of ours has written as follows,—"I am glad to know that another Osler has appeared. You may recall that William Osler's nom de plume was Egerton Y. Davis. Last year one of the House Staff at Hopkins sent a fabulous account to a scientific journal of an occurrence he had seen while on a cruise the preceding summer. (It concerned the love-making of a couple of whales). The journal took it seriously, published it, and sent the check for the manuscript to the author, 'Egerton Y. Davis, Jr.' The check was dropped in the hospital corridor **perhaps** by accident; it was turned in to the superintendent; and the gag soon was recognized. . . . The whole hospital has been chuckling, because the story can't be revealed—and no one dares to claim the check!"

Surgeons and anaesthetists (and a few ordinary people too) will be interested in the report by Kay and Blalock of Johns Hopkins on a new help in cases with CARDIAC ARREST. They report that intracardiac calcium chloride has been effective when epinephrine failed. Two to 4 cc. of a 10% solution was injected.

ONCE UPON A TIME someone gave the Comstock Hospital in Tucson (Crippled and Tuberculous Children) the complete setup for a dental room. . . . TIME HAS PASSED, and do you know what? No dentist has been available to do the job. Not even from the dental association, it is said. . . . SUDDEN THOUGHT—maybe someone will see this sad little note, and put a bug in a dentist's ear. They can't all be so busy that one or two couldn't man the chair for a couple of hours every week or so.

PATIENTS WITH GOITER AND HYPERTHYROIDISM do not bother Arizona physicians very often. The state is not in a goiter belt. . . . It should be remembered, however, that the 'Great Lakes area' is not the only source of goiters, and that several states bordering Arizona are goitrogenic. Utah and Nevada of the Mountain area and California of the West Coast area are involved.

Two 'cause and effect' items were published separately (and with a straight face) by the ARIZONA PUBLIC HEALTH NEWS. . . . Item No. 1—The x-ray technician who has recently been in charge of the traveling unit has just been married to a former technician. They have moved to Oklahoma. . . . Item No. 2—The future schedule for the x-ray bus has been cancelled. It will be started again as soon as a technician can be found.

Wyeth Inc. reports that a major use of streptomycin is in domestic fowl. About 75 per cent of the chickens and turkeys on the market have had the drug, due to its effect on sinusitis, etc. . . . As a result, the total sale of SM almost equals that of penicillin, and streptomycin is often in short supply. Wyeth makes a preparation much used by veterinarians.

The status of such costless journals as 'Modern Medicine' never seems very clear, altho they abstract excellent articles, quickly, and are often the source of entertainment and education. Perhaps we can't be much impressed by something for nothing. . . . Now, however, we have a reason abruptly to take a surprised look. . . . Dr. A. E. Hedback, who has been the fine editor of Modern Medicine, is retiring after 20 years. The new editor, believe it or not, is DR. WALTER C. ALVAREZ! . . . For years thousands of physicians have envied the versatility and imagination of Dr. Alvarez. No one, but no one, has exceeded his industry. Now, when he becomes the head of a project, it promises to be interesting. It also sets the project up a bit further.

Wolff of Washington, D. C. has recently surveyed the death toll from RHEUMATIC FEVER in childhood thruout the United States. . . . One of the oddities is the low mortality rate in ARIZONA, while that of Utah is constantly above the average. This latter variant is especially notable in boys from 15 to 19 years, and it is unexplained. . . . The differences in contiguous states "merit a more thorough examination".

The Bulletin of the N.T.A. describes NEW TB DRUGS in the news. (The abbreviation 'TB' is now official). . . . 'Vinactin A' is an antibiotic, made by Ciba, effective in mice. . . . 'G-469' is a French product, similar to TB-1, also effective in mice. . . . The Lebanese have used a sulphur-containing compound, combined with vitamin C. . . . The Parke, Davis 'Viomycin' is an antibiotic, previously reported, and still struggling for recognition. . . . None of these drugs has been safetly useful in humans up to the present date.

NEWS DEP'T.—The appointment of Dr. E. B. Jolley to the STATE BOARD OF HEALTH seems like a wise and interesting choice. It brings an industrial physician (Phelps Dodge Corp.) to a position where he can be of special help. He is a World War II veteran, and has good connections with national medical groups.

The advancement of Dr. W. Randolph Lovelace of nearby Albuquerque to chairmanship of the ARMED FORCES MEDICAL POLICY COUNCIL seems like a good move. Dr. Lovelace, once of the Mayo Clinic, has been head of the section of surgery of the Lovelace Foundation—a 'little Mayo Clinic' in New Mexico. He has had rare training, and has done some fine basic work in aviation medicine. As memory serves, he is the 'L' in the BLB oxygen mask, and he was a co-winner of the Collier Trophy Award in 1940.

'Hospital Topics' is a buyer's guide for hospitals. The October issue had a picture of CLYDE W. FOX on its cover. Dr. Fox is the administrator of the Washoe Medical Center at Reno, but was the catalytic agent while the Tucson Medical Center was in its most active evolution. He not only helped build, but he obtained approval by the American College of Surgeons. . . . We can bet five to one that, when the Washoe problem is solved, he will be off to another job with a challenge.

The grandaddy of all chest surgeons (as well as several other types of cutters) was DR. F. SAUERBRUCH of Berlin, who died in July at the age of 76 years. . . . Dr. Sauerbruch developed thoracoplasty, the low and high pressure chambers for lung resection, surgery of the heart, restorative operations on the war-disabled, etc. He was a great teacher and writer.

WATER NOTE OF THE MONTH,—Can you hold out until 1985? Hold out without more water, that is? . . . President Conant of Harvard told the American Chemical Society that we may expect to have plenty of fresh water from the ocean, due to cheap and abundant power, about 1985. . . . Thirty-four years to wait—unless Mr. Lewis Douglas and Co. can get it sooner from the clouds. . . . I'd like to bet a peso with Mr. Conant that someone does the trick closer to 10 than to 35 years.

ANTIBIOTIC MILESTONES,—OZENA (atrophic rhinitis) may be controlled to varying extents by instillations of streptomycin solution (plus vasodilators,) and occasionally plus penicillin, bacitracin, and gantrisin. . . . The legion of 'cures' for TRICHOMONAS VAGINALIS VAGINITIS is augmented by aureomycin. It has been used locally in powder or gelatin form with success. Relapses occur, especially in pregnant women. Terramycin is now being tried in suppository form. . . . A new report re-emphasizes the value of penicillin as a protection from respiratory infection in cases of ASTHMA. A delayed action drug was used, in doses of 1,200,000 units every 3 or 4 days. Claimed success, 70% control. . . . Massive therapy for ENDOCARDITIS caused by a resistant organism really means BIG these days. A case is reported where an average daily dose of 86 million, repeat, 86 million, units was given for 28 days, with recovery. Intravenous route is preferable to avoid tissue damage. (Remember the days when 40,000 units per dose was the new 'massive' therapy?) . . . Terramycin is now highly favored for that disease of Indians, Arabs, and wrestlers—TRACHOMA. It is miraculous for early and acute disease, only moderately less so for chronic lesions. Local therapy is preferred to systemic, ointment to solutions.

Keep an eye on the new method of determining GASTRIC ACIDITY. Segal, et Al., have eliminated the gastric-tube by using an ingested resin which has an attached substance for ion exchange. A quinine indicator is used. . . . If free H Cl is present in the stomach, the quinine will be replaced by hydrogen ions; the quinine is liberated, absorbed from the intestine, and excreted in the urine; a test for quinine in the urine then shows the gastric situations. . . . Some such test should be very useful.

LOCAL TALENT,—We constantly hope for medical research and papers from Arizonans. Most papers arise from a series of cases; most series arise from specialization. . . . A series which is mildly surprising, and which might make a neat report, is the 40 cases of alcoholism treated with Antabuse at the hands of Jackman Pyre of Tucson. . . . (In case someone else has more cases, maybe this note will smoke him out). . . . We are specially interested, not as an old alcoholic, but because Antabuse has been mentioned several times in this column since it was first described in the American non-medical press in 1949-50. Its first use by Jacobsen and Hald, in Denmark, began as recently as 1947.

Odds and Ends about GASTRO-INTESTINAL X-RAYING. Both ends, actually. . . . L. Ruzicks and Rigler of Minneapolis have described a double contrast method of VISUALIZING THE STOMACH WALLS. Barium is swallowed as usual; a stomach tube is passed; the barium is massaged so that it intimately covers the walls; the patient is placed in a supine position; 500 to 1,500 cc. of air is injected thru the tube; spot films are taken at intervals to show mural detail (before and during the escape of air and barium to the duodenum and esophagus) . . . 2. Levene and Veale of Boston believe that the ordinary barium enema routine is not satisfactory. They spray a THIN MIST OF BARIUM-WATER SUSPENSION onto the walls of the rectum, and sigmoid, and avoid the distention of other methods. (American Journal of Digestive Diseases).

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IN THE SUPREME COURT OF THE STATE OF ARIZONA

FRANCIS M. FINDLAY, M.D., WILLIAM F. ORLANDO, M.D., BRODA O. BARNES, M.D. and WALTER BRAZIE, M.D.,

Appellants,

—vs—

No. 5328

THE BOARD OF SUPERVISORS OF THE COUNTY OF MOHAVE, STATE OF ARIZONA, and W. H. RIDENOUR, A. J. MULLEN and LEE STEPHENS, constituting the members of said Board, and A. E. WALLACE, Clerk of said Board, and JOSEPH A. COPPA, Manager, Mohave General Hospital,

Appellees.

Appeal from Superior Court of Mohave County
Honorable H. L. Russell, Judge
Judgment Reversed

Charles P. Elmer, of Kingman
Favour & Quail, of Prescott,
Attorneys for Appellants
T. J. Byrne, of Prescott, of
Counsel
Carl D. Hammond, of Kingman,
Morgan & Locklear, of Phoenix,
Attorneys for Appellees

STANFORD, Justice:

This is an appeal from an order of the superior court quashing a writ of certiorari and dissolving the stay that had theretofore been ordered at the time the writ was issued. There was also made an order dismissing the petition upon which the writ had been granted.

The appellants (petitioners below) are four of the five practicing physicians in Mohave County. Located at Kingman, the county seat, is a county hospital known as the Mohave General Hospital, authorized, directed, and maintained under the provisions of Chapter 17, Arts. III and IV, ACA 1939, relating to the powers of the board of supervisors in maintaining favorable health conditions. Incidentally, this was the only hospital in the county and widely used by the residents of the northwesterly corner of the state. As a county hospital, it was completely under the control of the board of supervisors of Mohave County, who had provided a general manager therefor. On February 18, 1949, the respondent members of the board of supervisors passed a certain resolution or rule pertaining to the use of the facilities of the hospital by *any* doctor. This resolution, known as Resolution 111, is as follows:

> "RESOLVED, That if any doctor using Mohave General Hospital facilities is requested by another doctor, using such facilities, to assist him professionally and that doctor refuses or fails to give such assistance, then such doctor shall not be allowed to use said hospital facilities thereafter, except only for his patients in the hospital at that time."

On February 26, 1949, petitioner Barnes was notified by respondent Coppa, manager of the hospital, that he would no longer be allowed the use of the hospital, with the exception of the patients which he was then treating in the hospital. He was later notified that authority for this action had been obtained from the respondent board and was the result of an alleged violation of Resolution 111, supra.

In August of 1949, the three remaining petitioners received similar notifications and were also prohibited from further use of the hospital facilities. No charges were preferred and no hearing was given petitioners prior to the notifications. A statement was added at the bottom of each notice that petitioners could request a hearing if they so desired.

On August 31, 1949, petitioners filed their petition for writ of certiorari in the superior court of Mohave County, the Honorable J. W. Faulkner presiding. It was thereupon ordered that the writ issue and the respondents were commanded to certify and return the complete transcript of the record and proceedings held regarding the above mentioned notifications which petitioners had received. All proceedings, subsequent to the issue of the writ were heard and determined by the Honorable H. L. Russell.

There was also incorporated in the writ a stay requiring the parties in the meantime to desist from further proceedings in the matter to be reviewed. The purpose of the writ was to secure a review of the actions of the board of supervisors. The petition for the writ alleged:

(1) that the board had exceeded its jurisdiction in finding the respondents guilty of violating the resolution without notice and without trial; (2) that the board had exceeded its jurisdiction in denying the use of the hospital facilities to respondents; and (3) that the board had exceeded its jurisdiction in the adoption of the resolution for the reason that the resolution was unconstitutional and void in that it was unjust, unreasonable and exceeded the discretionary powers of the board.

After the writ was issued, respondents filed their motion to quash, which was thereupon denied by the court. They then filed their response to the petition which contained a partial record of the proceedings before the board and also denied certain material contained in the petition for certiorari, further alleging that petitioners had requested no hearing after the notification of violation of Resolution 111 and termination of their use of hospital facilities. For further response, respondents also set out details concerning the alleged violation which were not contained in the record of proceedings of the board. In this regard, we note particularly that the only matter contained in the certified record, pertaining to the alleged violations, is a copy of the minutes of the said board, which states merely that Resolution 111 had been violated, no particulars being set forth. It is stated in the return that there was no transcript made of such proceedings.

The court, after taking the matter under advisement, issued its order dismissing the petition for writ of certiorari, quashing the writ theretofore issued and granting respondents their costs, which order was supported by the court's written findings of fact and conclusions of law, filed in pursuance of petitioners' request.

In the lower court, and here, respondents questioned the use of the writ of certiorari to challenge the constitutionality of the resolution. Their position in this behalf was, and is, that the writ of certiorari may not be used to review the actions of inferior tribunals, boards or officers in the exercise of legislative, executive or ministerial functions. We have heretofore ruled that the writ is confined to a review of judicial action, and then only to determine whether the inferior tribunal, board or officer has exceeded its jurisdiction or acted without jurisdiction. Faulkner v. Board of Supervisors, 17 Ariz. 139, 149 P. 382. In State ex rel Andrews v. Superior Court, 39 Ariz. 242, 5 P. 2d 192, it was held that certiorari issues only to test jurisdiction and not to determine whether it was erroneously exercised. The inferior court must have jurisdiction of the subject matter, person and power to render the particular judgment which was given in order that the judgment be proof against attack by certiorari. Wall v. Superior Court of Yavapai County, 53 Ariz. 344, 89 P. 2d 624. In numerous other cases we have held that certiorari raises only the question of jurisdiction and not the errancous exercise thereof. If the resolution in question is so unreasonable and so unjust as to be unconstitutional, then the board, in attempting to enforce it *was* without jurisdiction. The rights of these petitioners were materially and substantially affected by it as were the rights of their patients and of the residents of Mohave County that had necessity for the use of the hospital's facilities and who might be admitted as paying patients. The principle of law laid down in the case of Mill v. Brown, 31 Utah 473, 88 P. 609, is fittingly applicable in the instant case. The court in that case said:

> "• • • If the law be unconstitutional, then the acts of the respondent which affect the rights of the applicant have no support, and are, therefore, void and of no force or effect. This inquiry goes directly to the power—juisdiction—of respondent to act, not to his qualification to do so, and hence can be inquired into in this proceeding. We cannot assent to the doctrine that a citizen affected by a law may not, at any time and in any judicial proceeding, attack that law as being unconstitutional and therefore void. An unconstitutional law by which it is sought to affect the rights of the citizen is of no force or effect and would not bind any one. Norton v. Shelby County, 118 U.S. 425-442, 6 Sup. Ct. 1121, 30 L. Ed. 178. Any act, therefore, of the respondent affecting the applicant's rights, if such act is based upon an unconstitutional law, is both without and beyond jurisdiction, and therefore void. The first objection cannot be sustained."

The board, in defending their actions, are relying upon their powers as conferred by law, pointing out that by the provisions of section 17-309, A.C.A. 1939;

"The board of supervisors, under such

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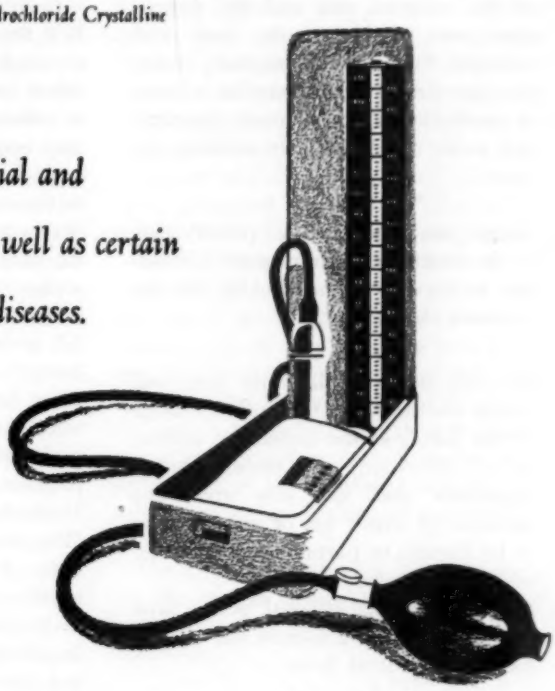

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limitations and restrictions as are prescribed by law, may:

* * *

"5. Provide for the care and maintenance of the indigent, sick and the dependent poor of the county; erect and maintain homes and hospitals therefor; provide in their discretion a farm in connection with the county hospital, and make regulations for working the same;

* * *

"17. Adopt provisions for the preservation of the health of their respective counties as necessary, and provide for the expenses thereof;

* * *

"22. Do and perform all other acts and things necessary to the full discharge of the duties as the legislative authority of the county government; but a supervisor shall not vote upon any measure in which he, or any member of his family, or partner, may be pecuniarily interested;

"23. Make and enforce all local, police, sanitary and other regulations not in conflict with general laws;

* * *

They also direct attention to section 17-404, A.C.A. 1939, which in part provides that:

"Except in emergency cases when immediate hospitalization or medical care is necessary for the preservation of life or limb no person shall be provided hospital or medical care hereunder without first filing with the board of supervisors * * * (indigent oath) * * *. The board of supervisors may admit into such hospital for hospital care, medical or surgical attention, any person other than an indigent who will pay, in part or in whole, for such hospital care, medical or surgical attention, under rules and regulations prescribed by the board. The admission of a paying patient shall not be to the inconvenience of any indigent patient."

In considering the reasonableness of the resolution under consideration we have taken into consideration the Code sections above referred to and that portion of section 17-349, A.C.A. 1939, wherein it is expressly provided that

"* * * Any person other than an indigent who has been admitted to the county hospital, may employ, without expense to the county, a physician or nurse who shall be permitted the necessary use of the hospital facilities or equipment. * * *"

It is thus seen that a paying patient has a right to employ his own physician. Does this regulation impinge upon this privilege? If the rule is enforced the patient is restricted in whom he may employ, for the regulation provides that he may not employ a doctor who has not acceded to the regulation and agreed to assist any other doctor professionally, presumably in the hospital. In other words, the doctor, before he may prescribe for his patient, must first agree that he will aid and assist any other doctor in the hospital; under what terms and conditions we do not know. Presumably, he might be required to assist without any assurance of being compensated for his services. He might be required to assist in an operation which in his honest judgment is unnecessary or should be deferred. Undoubtedly, any person worthy of the title of "Physician" or "Doctor of Medicine" would, in a case of emergency or many other situations, render professional aid and assistance to the best of his ability without thought of his obligations incurred under his Hippocratic Oath. Such is not the situation here. This regulation enforces his services not voluntarily contracted for or perhaps not desired by the patient, yet compulsorily enforced upon him. To enforce the rule would enslave him. It is of course axiomatic that licensed physicians have no constitutional right to practice their profession in a hospital maintained by state or political subdivision. Hayman v. City of Galveston, 272 U.S. 414, 47 Sup. Ct. 363, 71 L. Ed. 714. It is likewise the general law that municipalities may regulate and control their hospitals and prescribe reasonable rules and regulations to be followed by physicians using the facilities. Green v. City of St. Petersburg, 154 Fla. 339, 17 No. 417; Selden v. City of Stirling, 316 Ill. App. 455, 45 N.E. 2d 329. For the general rule, see cases cited, 41 C.J.S., Hospitals, Sec. 5. Any public hospital having adopted reasonable rules and regulations governing the practice of medicine or surgery cannot arbitrarily preclude a regularly licensed physician or surgeon the right to practice in such hospital, so long as such surgeon or physician stays within the law. Henderson v. Knoxville, 9 S.W. 2d 697, 60 A.L.R. 652.

The provisions of section 17-349, supra, expressly confer upon a paying patient in a county hospital the privilege of employing a private physician without expense to the county, and such physician shall be permitted the necessary use of the hospital facilities and equipment. This express provision destroys any implication of a power to exclude physicians from the use of the county hospital except for a nonadherence to reasonable rules and regulations. We are without professional knowledge as to what might be encompassed within the definition of "reasonable rules and regulations". The managements of all modern hospitals require physicians and surgeons to keep thorough and clinical reports concerning their patients and their treatment, which become records of the hospital. Wards are provided for obstetrical cases; contagious cases and operative cases. Additional rules provide for numerous hygienic precautions. The reading of the cases indicates that hospitals have adopted rules denying the young and inexperienced surgeons the right to perform certain operations in the hospital except under the guidance or observation of an experienced practitioner. The rules and regulations just referred to all have reference to an orderly management of the hospital and in most instances are made for the protection of patients. Such rules and regulations appear to be reasonable and no doctor could be heard to complain for having to comply therewith. But the regulation under consideration goes beyond and transcends the ordinary and commonplace regulations and invades the personal liberty and contractual rights of both the patient and the physician. To accede to the rule by what virtually amounts to compulsion would be repulsive and beneath the dignity of a professional man.

"• • • Physicians are not public servants who are bound to serve all who seek them, as are innkeepers, common carriers, and the like. • • •" 41 Am Jur., Physicians and Surgeons, Sec. 4.

"A physician is under no obligation to engage in practice or to accept professional employment, but when the professional services of a physician are accepted by another person for the purpose of medical or surgical treatment, the relation of physician and patient is created. The relation is a consensual one wherein the patient knowingly seeks the assistance of the physician and the physician knowingly accepts him as a patient. • • •" 41 Am. Jur., Physicians and Surgeons, Sec. 71.

In view of the circumstances surrounding this case it is apparent that petitioners had no plain, speedy and adequate remedy to protect their rights and to fulfill their obligations as physicians in the treatment of the private patients who might be regularly admitted as paying patients. Respondents suggest that a declaratory judgment and an appeal in the event of an adverse judgment would have afforded adequate relief. With this contention we cannot concur.

We therefore hold that the resolution was unconstitutional; that all action taken under it is and was of no effect. Having reached this conclusion, it is by way of anti-climax to point out that the resolution provided no method for review and that the action of the board in finding the petitioners guilty of violating the rule without accusation, notice or trial, finds no basis under our system of law requiring due process where substantial rights of citizens are infringed upon or destroyed.

The judgment quashing the writ and dissolving the stay in reversed, and the trial court is instructed to enter judgment reinstituting the desist order.

Judgment reversed.

R. C. STANFORD
Justice

CONCURRING:

LEVI S. UDALL
Chief Justice

ARTHUR T. LaPRADE
Justice

PHELPS and De CONCINI, Justices (Specially Concurring):

We concur in the result reached in this case to the effect that the judgment of the trial court quashing the writ of certiorari and dissolving the stay must be reversed but we heartily disagree with the ground assigned in the majority opinion for its reversal, to wit, that the resolution passed by the board of supervisors is unconstitutional.

The ground upon which the judgment of the lower court should be reversed, in our opinion, is that in the finding of the board; that the appellants had violate reslution No. 111 previously passed by it; and in its order prohibiting appellants from further use of the facilities of the county hospital the board was in the exercise

of a judicial function. It was therefore without jurisdiction to render the judgment complained of until it had given appellants an opportunity to be heard and had presented to it evidence sustaining the finding that appellants refused to assist the county doctor professionally in the treatment of patients or in the performance of operations upon patients confined in the county hospital.

Let us pause here to observe that the word *professionally* has no such connotation as indicated by the majority opinion. It would not only not be professional but it would be highly unprofessional for a physician to assist in the performance of an operation which he believed to be unnecessary or unwise to perform at that time.

As we view the matter there is no basis whatever for holding that resolution No. 111 is unconstitutional. No provision of the constitution is involved and no effort has been made to point to any specific provision thereof which the resolution violates.

All of the powers of the board of supervisors were granted to it by the legislature and it has only such powers as have been expressly, or by necessary implication, delegated to it. Section 17-305 (5), A.C.A. 1939, relating to the construction and maintenance of hospitals for the indigent sick and the dependent poor is set out in full in the majority opinion. Section 17-348, A.C.A. 1939, provides:

> "No person other than an indigent shall receive public aid, or be admitted into any home or hospital the expenses of which are paid by the county, and any contractor or person having charge of any such home or hospital who knowingly receives into the same, for medical attention or subsistence, any person other than an indigent, shall be guilty of a misdemeanor. The board may admit into such hospital for hospital care, medical or surgical attention, any person other than an indigent who will pay, in part or in whole, for such hospital care, medical and surgical attention, *under rules and regulations prescribed by the board.*" (Emphasis supplied.)

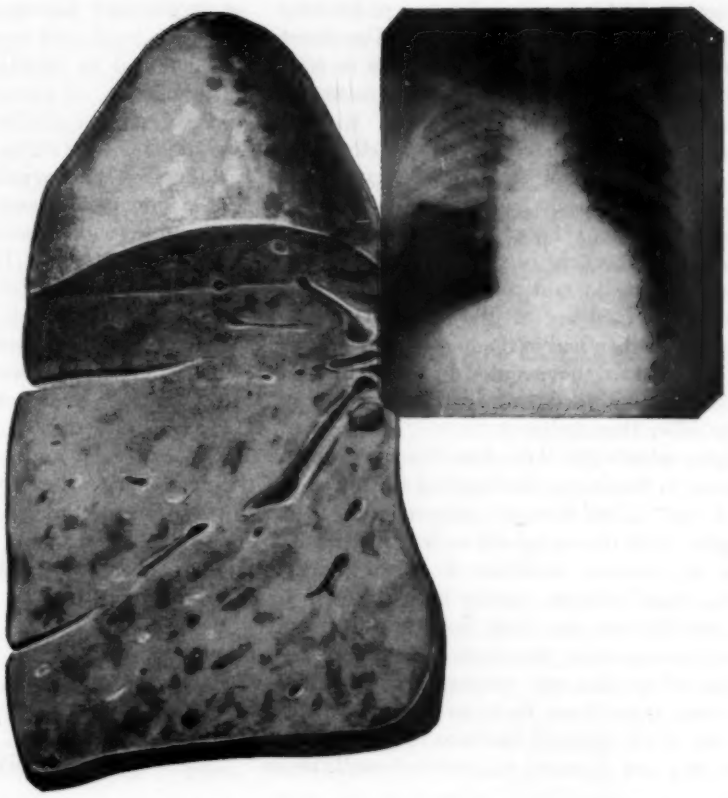
The material portions of section 17-404, A.C.A. 1939, are set out in the majority opinion and will not be here repeated. This section contains at the end thereof identically the same language as section 17-348, supra, relative to the admission to the hospital of persons other than indigent patients and reiterates the power of the board to adopt rules and regulations governing their admission and treatment. Section 17-349 provides in part as follows:

> "* * * Any person other than an indigent who has been admitted to the county hospital, may employ, without expense to the county, a physician or nurse who shall be permitted the necessary use of the hospital facilities and equipment. The admission of a paying patient shall not be the inconvenience of any indigent patient and an indigent patient shall receive the same care and treatment accorded to pay patients."

We believe all of the members of the court agree that in adopting resolution No. 111 the board of supervisors was acting in a legislative capacity. This being true we are neither concerned nor have we the authority to question either the reasonableness or the wisdom of the board in adopting it. These matters rest exclusively with the board. The authority of this court is limited solely to the determination of the question of whether the board in passing resolution No. 111 acted within the power and jurisdiction vested in it by the provisions of law above quoted. We think it did.

The board of supervisors is charged by the above law with the duty of providing for the care and maintenance of the indigent sick and the dependent poor of Mohave County and were empowered to build and maintain a hospital for that purpose. The power to maintain carries with it by implication the power to supervise and control it. The hospital is the property of Mohave County. Except in emergency cases when immediate hospitalization or medical care is necessary for the preservation of life or limb no person is allowed to be admitted to such hospital without first applying to the board of supervisors for such admission and it is made a misdemeanor for any person in charge of the hospital to admit a person for hospital care, medical attention and subsistence without the consent of the board. Sections 17-348 and 17-404, supra, provide that the board may admit paying patients *under rules and regulations prescribed by it.* The language used in these sections amounts to an express grant of power to adopt rules and regulations governing the admission of paying patients.

A public hospital operated by the county has



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none of the characteristics of a public service corporation and is not bound to accept for treatment anyone who applies therefor. The statute expressly gives to the board the power to reject paying patients. In our view of the matter the clause "may admit into such hospital" is purely permissive and when considered together with the entire act cannot under any circumstances be construed to mean "must admit * * *".

Resolution No. 111 was adopted in accordance with and in the light of the above statute. Provision is made in said resolution for appellants to use the facilities of the hospital for any patient they then had in the hospital. The board has the right as above stated to refuse to admit to the hospital for treatment any and all patients other than indigent.

Upon what right then does the claim of appellants to the use of the hospital and its equipment rest? They have no property right in the hospital or in its equipment or its facilities. The right to practice medicine is not a property right. Appellants are merely licensees as medical practitioners and their licenses may be revoked at any time for cause. Therefore they cannot claim that any property right of theirs has been taken from them, in denying to them the use of the hospital facilities. The mere fact that they are licensed to practice medicine in the state and are engaged in the practice thereof in Mohave County does not of itself give them any legal right to arbitrarily use the county hospital and its facilities in the furtherance of their practice. It cannot logically be said therefore that the regulation adopted by the board violated any legal rights of appellants. The board in adopting such regulation was acting within the express powers granted it by the legislature.

For this court to hold that the board may not adopt regulation No. 111 relating to the proper conduct and control of the county hospital for the purposes for which it was built and is maintained amounts to a mandate that the board of supervisors must abdicate its powers and authority to manage and control the hospital property of Mohave County, and by judicial fiat turns its management and control over to appellants including the power to dictate the appointment of the county physician of that county. It amounts to the taking of property without due process of law in violation of both the state and Federal Constitution.

M. T. PHELPS
Justice

EVO DeCONCINI
Justice

(Decided Apr. 23, 1951)

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MEDICAL CARE RELATIVELY CHEAPER THAN IN 1935-39

The American Medical Association reported that the price of medical care, including drugs, hospital room rates and physician and dental services, was relatively 14 per cent cheaper in 1950 than during 1935-39.

This was revealed in the Consumers' Price Index, compiled by the U. S. Bureau of Labor Statistics.

The Bureau's Index indicated a 72 per cent rise in the cost of living since the 1935-39 base period while, at the same time, showing that medical care prices rose only 48 per cent.

The increase for food, the Index showed, was 104 per cent; apparel 88 per cent; rent 31 per cent; fuel, electricity and refrigeration 41 per cent; house furnishings 90 per cent; and 57 per cent for the items which the Bureau of Labor Statistics classified as miscellaneous. Only two of these items—rents, and fuel, electricity and refrigeration—rose less rapidly than medical care prices.

The 72 per cent rise in the cost of living as compared with only a 48 per cent rise in medical care prices indicates that for every $1 paid for goods and services generally in 1935-39, the 1950 consumer had to pay $1.72. On the other hand, the medical care purchased for $1 in 1935-39 cost only $1.48 in 1950.

An analysis of the Index discloses further that a dollar in 1950 could buy 68 cents worth of medical care but only 58 cents worth of all goods and services, or 86 per cent as much. The 1950 purchasing power of the dollar was 86 per cent as high in terms of goods and services, generally, as it was in terms of medical care prices only. Thus, in terms of the purchasing power of the 1950 dollar, medical care was relatively 14 per cent cheaper than in 1935-39.

Physicians' fees, according to the Index, rose 40 per cent or only a little more than half as rapidly as the entire cost of living, which rose 72 per cent.

Only hospital room rates, which increased 135 per cent, have risen faster than the entire Consumers' Price Index.

"The high hospital rates," an A.M.A. study of the Consumers' Price Index said, "reflects the fact that hospitals are singularly exposed to the forces of inflation."

Commenting on the relatively cheaper medical care prices today, Dr. John W. Cline, San Francisco, president of the A.M.A., said that "physicians recognize that the cost of medical care, especially hospital care, is a serious budget item for many persons. Therefore, the doctors are strongly supporting various voluntary prepayment insurance plans to help meet these costs."

"The fact is, however," Dr. Cline continued, "that, as shown by official government statistics, medical care prices today, as compared with the prices of all goods and services, are relatively less than they were 15 years ago."

AMERICAN COLLEGE OF PHYSICIANS

A regional meeting of the American College of Physicians was held in Phoenix, Arizona, Saturday, September 29, 1951, at Hotel Westward Ho. Approximately 100 members of the medical profession from Arizona and New Mexico were in attendance.

Dr. Dwight L. Wilbur, Clinical Professor of Medicine at Stanford University School of Medicine in California, discussed causes of failure in the medical treatment of peptic ulcer. He stated that if a patient with peptic ulcer under controlled conditions in the hospital does not become symptom free within a very few days, one must look for some complication such as a perforating type of ulcer, obstruction, or some other disease that is giving pain rather than the ulcer, such as gall bladder or pancreatic disease. He declared that the cause of stomach ulcer still baffles the medical profession; further, that "physicians now are no nearer a solution to the stomach ulcer problem than they were 50 years ago." X-ray now makes diagnosis more positive in the nervous type of individual who is more susceptible to ulcers. Physicians are presently deemphasizing surgery and returning to diet and medical treatment for stomach ulcers.

Dr. Roy Hewitt of Tucson presented a paper on intermittent positive-pressurue breathing therapy. He discussed the physiology of respiration and the fact that some patients with dyspnea will blow off enough carbon dioxide to decrease their respiratory stimulations. Administering oxygen to these patients will make them worse and the respirations will decrease still more. He gave instances of beneficial results in some patients with emphysema, some with asthma and some post-operative patients

who fail to breathe and raise sputum properly.

Dr. Morris Deitchman of the Phoenix Regional Veterans Administration Hospital gave a paper on direct venous pressure in chronic right heart disease. He stated that chronic right heart failure can be diagnosed earlier by taking a venous pressure reading and changes can be brought out by the simple maneuver of pressure over the liver.

Dr. Israel Wolger of the Veterans Hospital at Prescott discussed carcinoma of the lung in patients with chronic pulmonary diseases. He cited several instances of carcinoma of the lung in patients with chronic emphysema, bronchiectasis and tuberculosis. He emphasized the fact that patients can have a malignancy in association with their previous disease.

Dr. Joseph Bank of Phoenix gave a paper on primary carcinoma of the liver. Diagnosis of this disease is very difficult and is usually made at postmortem unless one thinks of this condition. Four cases of this disease were presented.

FOURTH ANNUAL PUBLIC RELATIONS CONFERENCE

Your Executive Secretary was privileged to attend the Fourth Annual Public Relations Conference sponsored by the American Medical Association, held in Hotel Biltmore, Los Angeles, December 2 and 3, 1951. Also in attendance were Frank J. Milloy, M. D., Secretary, and William B. Steen, M. D., Chairman of the Board of Public Relations, both of this Association; Dermont W. Melick, M. D., President, Leslie B. Smith, M. D., President-Elect, Frederick G. Mitten, Executive Secretary, and Miss Alma Alkire, representatives of the Maricopa County Medical Society.

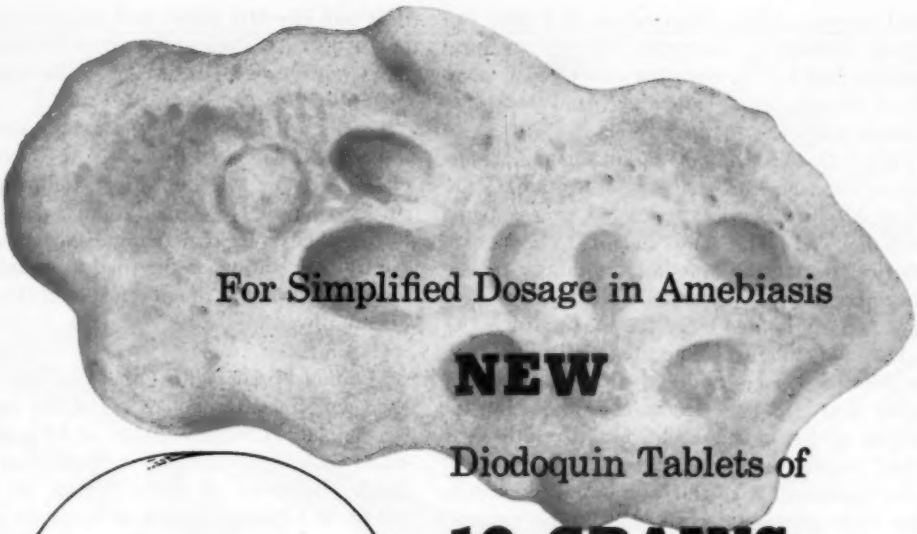
On Sunday, December 2, John W. Cline, M. D. of San Francisco, President of the American Medical Association, delivered the address of welcome and introduced Louis H. Bauer, M. D. of Hempstead, New York, President-Elect, who delivered the keynote address: "Working Together in '52." He urged all physicians to unite and work together in an effort to "restore what has been destroyed of our individual liberty." He continued: "One trouble today in the United States is the lack of civic responsibility of many of our citizens. Our duties as doctors are great, but our duties as citizens are even greater. This country has been built on a spirit of competition and free enterprise. During recent years there has been a studied attempt to diminish the importance of self-reliance or the desire to improve one's lot and substitute instead a dependence on government. America has become a bureaucracy, ruled largely by administrative law." Physicians must accept their civic responsibilities and "lead the way back to freedom," enlisting the support of other organizations and individuals. "We have a minority government because on the last national election only 47 per cent of those entitled to vote actually voted. Physicians must join in the fight for Americanism."

The afternoon session was presided over by Gunnar Gundersen, M. D. of La Crosse, Wisconsin, Chairman of the Executive Committee of the Board of Trustees of the American Medical Association.

Ernest Dichter, Ph. D. of New York, Psychological Consultant, addressed the group taking for his subject: "A Psychologist Studies Medical Care." Dr. Dichter recently completed an intensive medical care study in California. He stated: "We should not lose track of the emotional element involved in the high cost of sickness. People do not complain about the high cost of television sets because they don't have any animosity toward TV. Everyone dislikes sickness. He cited the importance of the psychological element in maintaining the doctor-patient relation ship. Pointing to the conflict between idealism as against realism, he stated people have become more mature and are reading considerably more today. They want to know. They consult the doctor sooner and more frequently. Patients want to know the why and wherefore. There seems to be a lack of explanation regarding the high cost of medical and hospital care, and while it may be impossible to substantiate such costs through facts, the public's emotions must be combated in their desire for enlightenment. The doctor should state individually and publicly his realistic idealism. That certain resentment against doctors must be attacked patiently. Public resistance must be removed. The doctor should recognize that the world has changed and continues to change, and that medical practice is part of this world.

Edgar A. Schuler, Ph. D. of Detroit, member of the Department of Sociology at Wayne University, reported on a survey of medical care opinion in the Toledo, Ohio area, conducted by the Health Information Foundation of New York.

Lawrence W. Rember of Chicago, Director of



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SEARLE RESEARCH IN THE SERVICE OF MEDICINE

Field Service, AMA, Department of Public Relations, selected as his topic, "An Urban-Rural Opinion Test Tube", reporting on a recently completed survey about medical care and doctors in a southern Illinois community.

Joseph D. McCarthy, M. D. of Omaha, Chairman of the American Medical Association, Council on Medical Services, presided over a panel discussion on "The Cost Factor In Everyday Practice" during the Monday morning session of December 3. "Fees Should Be No Mystery" was the subject presented by Harlan A. English, M.D. of Danville, Illinois, Committee on Rural Medical Service, Illinois State Medical Society. The three most frequent questions asked by the patient of the doctor following diagnosis are: "Doc" can this be cured? How long will it take? How much will it cost? He urged all doctors to take time to discuss costs during the patient's first visit, particularly where surgery is indicated. It was recommended that it would be better to cancel a charge than reduce a fee in deserving situations.

Cyrus W. Anderson, M. D. of Denver, Chairman of the Board of Trustees of the Colorado Medical Society, had for his topic: "Explaining Those 'Other' Medical Expenses." Reviewing medical costs in 1871 when office calls were $3.00 and prescriptions $2.00, with those of today, in comparison with increased costs for labor and other commodities, he pointed the need for a more detailed explanation to the patient of hospital costs; tests, routinely or otherwise required; cost of expensive drugs and benefits expected through their use; consultation and anesthetic fees when indicated; and recommended that all bills be itemized. He urged establishment of a "code of cooperation" with the doctors similar to that in practice in Colorado with the press.

Dr. E. E. Wadsworth of Alhambra, California, read the paper prepared by Dr. Stanley R. Truman of Ventura, California, Past President of the American Academy of General Practice (who was ill) entitled: "Time is Money for Your Patients, Too."

A second panel during the morning session on "Medical Society Solutions to the Cost Problem" was presented. Stanley R. Mauck of Columbus, Ohio presented the "PR Factor in Collecting Bills"; Earl W. Mericle, M. D. of Indianapolis, Chairman, Public Relations Committee, Indiana State Medical Association, spoke on "Your Patient and His BIG Bills"; and Joseph F. Donovan of San Jose, California, Executive Secretary, Santa Clara County Medical Society discussed: "The 'Regardless of Ability to Pay' Idea."

Possibly the highlight of this day's session was the address delivered by Lewis A. Alesen, M. D. of Los Angeles, President-Elect, California Medical Association. He warned there is danger ahead in the philosophy that "capitalism is just a temporary way station on the road to socialism." He vigorously pointed out the responsibility of American physicians to reverse the trend toward socialism.

"Joining Forces With Other Groups", was the theme of the afternoon panel under the Chairmanship of Harvey Sethman of Denver, Chairman, Advisory Committee to the Department of Public Relations of AMA. Ernest B. Howard, M. D. of Chicago, Assistant Secretary of AMA, spoke on "Representing Physicians on the National Level"; Willis H. Huron, M. D. of Iron Mountain, Michigan, Past Councilor of the Michigan State Medical Society, discussed "State-Wide Organizations and the Medical Society"; and George Schwartz, M.D. of New York, Committee on Public Relations, Bronx County Medical Society, reviewed "The Doctor in Community Affairs."

Leo E. Brown of Chicago, AMA, Director of Public Relations, as Chairman of the panel, "Where Do We Go From Here?", reviewed 'Your AMA's 1952 PR Program"; Joseph E. Mott, M. D. of Patterson, New Jersey, Sub-Committee on Public Relations, Medical Society of New Jersey, spoke on "Public Relations Goals for State Societies": Fred G. Mitten, Phoenix, Arizona, Executive Secretary, Maricopa County Medical Society reviewed, "What the County Society Can Do." He made a splendid presentation which was well received. Charles R. Henry, M. D. of Little Rock, Arkansas, President, Arkansas State Medical Society discussed, "The Individual Physician's Role."

More than 450 persons were registered for the two day conference. Most significant is the fact that today in excess of 77,000,000 people in the United States have some form of prepaid health insurance. The voluntary way is the American way, and as we continue to "pull together through '52", the battle against socialism in this great country of ours will be more readily achieved.

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1951 ARIZONA GOVERNOR'S CONFERENCE ON CHILDREN AND YOUTH

The Governor's Conference on Children and Youth was held in Phoenix, November 9-10 at Phoenix College. The Conference's eight hundred delegates included representatives from many civic and welfare organizations, and outstanding leaders from various youth groups. The Arizona Medical Auxiliary was represented by the following delegates:—Mrs. George S. Enfield, State; Mrs. T. C. Harper, Globe; Mrs. T. W. Woodman, Mrs. Dwight Porter and Mrs. Jesse Hamer, Maricopa; Mrs. Joseph M. Kinkade, Pima; and Mrs. Harry T. Southworth, Yavapai.

Friday's sessions included registration, panel discussions and two general sessions. The opening General Session presented a resume of the White House Conferences and talks on "What Youth Expects of This Conference." The evening Session was high-lighted by Governor Howard Pyle's "Keynote Address" followed by W. Cleon Skousen's discussion of "Teen-Age Troubles". Saturday's activities included Workshop Sessions and closed with a final Plenary Session at which findings and recommendations of the Workshops were presented for adoption.

Topics discussed in the Workshops were:—

1. The Role of Formal Education in the Development of Youth.
2. Recreation and Leisure Time of Youth.
3. Toward an Improved Home and Religious Environment.
4. The Law and The Child.
5. Children in Minority Groups.
6. Mental and Physical Health of the Child.

In the following paragraphs is given a condensation of a few of the seventy-five recommendations made by this conference. Particular attention has been paid to those recommendations which have a direct bearing on the problems as stated in the Survey Report of Arizona s Children and Youth (conducted by the Arizona Council on Children and Youth.) A copy of the Survey and of all recommendations adopted may be obtained from Mr. John F. Allanson, Executive Secretary of the Arizona Council on Children and Youth, State Office Building, Phoenix, Arizona. There is a charge of fifty cents to cover cost of printing and mailing.

FINDINGS OF THE SURVEY

I. EDUCATION

Present Arizona education laws only require school attendance for youth under the age of sixteen, or fourteen (with a few simple and easily met specifications), or until the child has completed the eighth grade. The present national trend among the states is to raise the required age limits to at least sixteen years of age and with as few exceptions as possible.

The average classroom load obtained from figures given was 33. This was due to many districts reporting low numbers which counterbalanced the crowded conditions in the city schools where classes were staggered to meet the needs.

II. RECREATION AND LEISURE

Six counties reported tax supported programs in 1949. Most are recent, since only Maricopa and Pima counties were receiving tax support prior to 1948.

Private volunteer agencies operate in many counties. Are limited by so few available volunteer leaders.

It was noted in Maricopa County that over 91% of the juvenile cases were listed as belonging to no youth organization of any kind.

The problem of unemployed youth, who cannot obtain employment has grown more significant as a contributing factor to juvenile delinquency.

III. HOME AND RELIGIOUS ENVIRONMENT

Reports estimated that as low as 18% to 25% of the total children and youth groups in some counties were in attendance at a Sunday School. Family participation in church programs were checked and figures ranged from 40% to 61% of parents of children in Sunday School, who participate to some degree in church programs.

It is likewise noteworthy that a reliable law enforcement agency indicated that "Most of the cases listed as 'Juveniles' who specified themselves as having no religious affiliations, have usually been found to be the real 'Juvenile Delinquents' and are the ones responsible for most of the serious crimes committed by youth."

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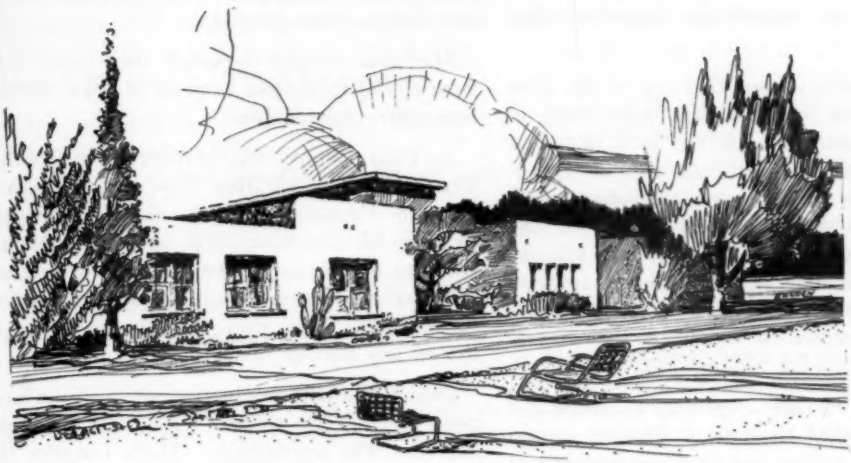

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IV. THE LAW AND THE CHILD

In regard to serious crimes, narcotic addiction among youth was felt to be one of the state's greatest criminal problems with juveniles, not only in its own respect, but perhaps even more so in its role as contributing factor to other crimes.

It was generally agreed that one of the most serious problems with children today both in Arizona and nationally, is the lack of moral and religious training (particularly in the home). Because of the lack of genuine interest and good examples on the part of many of our homes and some of our churches and schools, an increasing number of our youth has come to rely on such things as cheap magazines and movies as examples to follow in their moral and religious training and education.

Arizona has no law requiring a license for day care. In 1948 the city of Phoenix passed an ordinance requiring that day care centers and nurseries handling five or more children be inspected for health and safety. Additional control and supervision of such care is needed for the protection of pre-school children in the state.

According to police records, the "Danger Age" of youth in Arizona ranges between 14 and 17 years of age. It is in this group that the greater majority of crimes committed by juveniles are found. The greatest number of violations had been on the following counts listed in order—traffic violations, petty larceny, malicious mischief, burglary, drunkeness, incorribles, run aways and morals.

The Arizona Youth Authority, created by an act of Legislature in the 1951 session, is capable of doing a very beneficial job in the rehabilitation of delinquents. Its function is "to provide and administer corrective and preventive training and treatment for persons committed to it." However, this agency was not provided funds to carry on its work, and therefore, has been seriously handicapped in carrying on an effective program.

V. CHILDREN IN MINORITY GROUPS

The law which demanded segregation of negro children through the eighth grade was repealed by the last legislature and now gives the local boards of education discretion as to segregation in elementary as well as secondary schools.

There is a law of miscegenation in Arizona which bars legal marriage between the races. Surveys indicate that where children are born of these illegal marriages they are the ones to suffer, as it is possible for the marriage to be annulled on these grounds.

Maricopa County reported that many jobs were closed to negroes because of color distinction rather than ability.

In Pima County the Mayor's Law Housing Committee revealed that 72% of the housing units in Tucson's worst slums were occupied by Spanish-American, 26% more by Negro. Housing conditions of the majority of negroes were acclaimed as substandard and, if they were economically able, they did not feel free to live in any part of town they choose.

During the past few years more Indians have been moving into the fringes of our communities from the reservations. Many counties felt that the problem of integrating the Indian people into our American way of life was becoming the major minority group problem, principally because more and more of them have left and are being encouraged to leave the isolation of the reservations.

VI. MENTAL AND PHYSICAL HEALTH OF CHILD

The 1950 estimate of Arizona's population under 15 years of age was approximately 243,000 or about 23% of the total state population.

There is a serious shortage of Doctors, Public Health Nurses, and Sanitariams in the State.

The national per capita legislative appropriation for public health is 63 cents, Arizona's appropriation is 19 cents per person.

Arizona's infant mortality rate last year was the second highest in the nation due to the high infant mortality among the Indians. Due to their low economic status they are forced into substandard living conditions which facilitated the spread of such diseases as diarrhea-enteritis, which is their particular enigma, and has contributed to their high infant mortality rate.

Arizona's death rate from Tuberculosis is three times national average. Percentage of tuberculosis in native-born is greater than in those from other states. There are no hospital facilities for non-Indian tubercular chil-

dren. There are only about 300 hospital or sanatoria beds available for over 10 thousand active tubercular cases in state.

There is very little being done in Mental Hygiene among children and youth in Arizona although the need for such service is great. The Children's Colony will be able to accept only a third of the cases submitted for entrance.

Only one county—Cochise—has an organized dental program for children.

—cover peddling and use of marijuana, as well as narcotics.

—make offenses a felony with strong penalties.

RECOMMENDATIONS OF THE CONFERENCE

I. EDUCATION

Schooling until the sixteenth year, "except for children of fifteen years who cannot profit by further available education."

Reduce class size and implement teaching to units of not over 25 children per teacher with compulsory age reduced to six years for starting school.

II. RECREATION AND LEISURE

We recommend a recreation and leisure time program for youth that has a definite purpose, and is creative, to include such activities as photography, art work, dancing and music.

That we should have programs of family recreation, but that families should begin to realize the necessity of their assuming more of the recreational load.

That more Youth Employment Services should be set up throughout the state as a means of giving youth gainful employment from which he gains character building benefit.

III. HOME AND RELIGIOUS ENVIRONMENT

That religion, as such, not be taught in the schools.

That there be released time in public schools for a program of religious instruction with this to be voluntarily supported and participated in by all churches.

That the family unit be re-established through a weekly family night in the home to increase the moral and spiritual values of our home life.

That in employing teachers, school administrators should require appointees to have an appreciation of religious values and that their teaching attitude uphold the importance and dignity of all religious faiths.

IV. THE LAW AND THE CHILD

That the state adopt a narcotics law which will—

—provide sufficient staff and adequate finances for enforcement.

That the Arizona Sexual Psychopathy Act (Child Molesting), as already drafted and presented at the 1948 and 1950 Sessions of the Legislature, be considered as a basis for final recommendation of the Governor's Conference on Children and Youth.

That civic and church groups conduct a program of adult education to accompany the efforts on the state level and secure local and state enforcement of laws concerning Children and Youth.

That a law requiring the licensing of all commercial homes and institutions providing group day care of children, providing for the setting up of minimum standards for such care and that the State Department of Public Welfare be the licensing agent.

That a complete study of the liquor laws be made with special attention to—

1. That section dealing with penalties as they now exist, be changed and that the following penalties be recommended—
   a) upon the conviction of the owner of a liquor establishment, or anyone in his employ, of the sale of liquor to minors it shall be mandatory on the part of the commissioner to suspend said license for a minimum of 30 days and a maximum of 90 days.
   b) upon the conviction a second time it shall become mandatory that said liquor license shall be revoked permanently and said licensee shall never be given the privilege of owning or operating any type of liquor establishment in the State of Arizona.

Recommend support of the Youth Authority Act and urge its activation, including appropriations.

V. CHILDREN IN MINORITY GROUPS

Complete integration of students and faculty,

instead of segregation, in schools of Arizona.

All laws of Arizona which bar the legal marriage of people of different races be abolished because of the detrimental effect on children and youth.

Legislation be enacted for fair employment practices in view of the effect of restricted employment upon the personality development of children and youth.

In order to insure the welfare of all children and youth good housing should be integrated and that maximum emphasis be placed on maintaining standards of health, comfort and decency in both private and public housing and that the standards be made available to people regardless of race, color or creed.

Resolution—presented by Thomas A. Segundo Papago Tribal Council Chairman.

Whereas, the State of Arizona does not provide care for Indian Crippled Children and

Whereas, the Medical services of the Bureau of Indian Affairs is not in a position to handle a program of this size, and

Whereas, the Federal Funds are being denied the State of Arizona because the State discriminates against crippled Indian children

Whereas, the Indian crippled children who are being denied corrective medical service are a potential financial liability to the State during the coming years,

Therefore, Be It Resolved that the Arizona Governor's Conference on Children and Youth recommend to the Governor and the State Agency administrating the services for crippled Indian children on the same basis as all other crippled children in Arizona.

VI. MENTAL AND PHYSICAL HEALTH OF CHILD

That we extend to more areas the Well-Baby Clinics including pre-natal, post-natal and premature baby care as well as for young children.

That appropriations be increased for personnel to carry out our present health laws.

That Congress transfer Indian Medical Service from the Bureau of Indian Affairs to the United States Public Health Service, thus bringing up the appropriation on the State level and bringing the care of Indian children under State Public Health supervision.

Since tuberculosis is one of the greatest killers of young people we recommend that a definite program of tuberculosis control be formulated by the State Department of Health and others interested and be presented to the legislature for implementation.

That colleges be encouraged to provide workshops on mental health and that the public schools be asked to adopt the general theme "Improving Mental Health" for one or more years.

That an office of Director of Dental Health be instituted in the State Department of Health. This officer shall be a member of the State Dept. of Health and be responsible to the State Director of Health.

Mrs. Dwight Porter
Mrs. George S. Enfield
Phoenix, Arizona

SOCIETY OF MEDICAL CONSULTANTS OF WORLD WAR II

W. Paul Holbrook, M. D. of Tucson was recently appointed a member of the Advisory Board of the Society of Medical Consultants of World War II. Other officers are: Dr. Grover C. Penberthy of Detroit, President, succeeding Dr. Garfield C. Duncan of Philadelphia; Dr. John Minor of Washington, Vice President; and Dr. Worth B. Daniels of Washington, Secretary.

Major General George E. Armstrong, Army Surgeon General, reported that another year will be required before efficacy of primaquine for malaria is fully determined.

PERSONAL NOTES

Dr. Kenneth C. Baker, Tucson, has returned from Chicago where he attended the 10th annual meeting of the Academy of Dermatology and Syphilology at the Palmer House.

———o———

Dr. R. Lee Foster attended the meeting of the Radiological Society of North America at Chicago December 7, 1951. He attended refresher courses in the following subjects: Radiotherapy, Roentgen Diagnosis of the Orthropathies, Diseases of the Chest in Infants and Children, Cancer of the Male Genital Tract, and The Chest in Industry.

Mrs. Foster accompanied him and on their return trip they visited relatives in Dr. Foster's boyhood home in Southern Illinois.

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